SEMINAR ON AGRICULTURAL ADMINISTRATION
(March 9th - 12th, 1966)

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SEMINAR ON AGRICULTURAL ADMINISTRATION

(March 9th-12th, 1966)

P R O G R A M M E

Wednesday March 9.	10.00 a.m. to 11.15 a.m.	Welcome: Dr. J.N. Khosla, Director. Inaugural Address: Shri C. Subramaniam, Minister of Food & Agriculture. Vote of thanks: N. Srinivasan.
	11.30 a.m. to 1.00 p.m.	Planning for Agricultural Development. Chairman: Shri Tarlok Singh.
	Second Session. 3.00 p.m. to 5.30 p.m.	Planning for Agricultural Development(Contd) Chairman: Dr. P.S. Lokanathan. Rapporteur: Dr. S.R. Sen.
Thursday March 10.	10.00 a.m. to 1.00 p.m.	Agricultural Extension Programmes. Chairman: Shri P.N. Thapar.
	Second Session. 3.00 - 5.30 p.m.	Agricultural Extension Programmes(Contd.) Chairman: To be announced. Rapporteur: Shri D.V. Reddy.
Friday March 11.	10.00 a.m. to 1.00 p.m.	Programme Administration. Chairman: S.D. Misra, Dy.Minister of Agriculture.
	Second Session. 3.00-5.30 p.m.	Programme Administration (Contd.) Chairman: To be announced. Rapporteur: Shri B. Sivaraman.
Saturday March 12.	10.00 a.m. to 1.00 p.m.	Union-State-Field Relations. Chairman: Shri B. Sivaraman
	Second Session. 3.00-5.30 p.m.	Union-State-Field Relations(Contd.) Concluding Address: Shri Asoka Mehta. Chairman: Shri S.G. Barve. Rapporteur: Prof. N. Srinivasan.

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SEMINAR ON AGRICULTURAL ADMINISTRATION

(INDIAN INSTITUTE OF PUBLIC ADMINISTRATION)

NEW DELHI, 9th MARCH, 1966

INAUGURAL ADDRESS

by

C. SUBRAMANIAM

Friends,

The current shortage of food makes it very appropriate that the Indian Institute of Public Administration should hold a seminar to focus attention on the problems of agricultural administration. At the very outset, I should say that this is a much discussed subject and various solutions to the problem have been put forward. If progress in the reorganisation of agricultural administration has been halting, it is not for want of an enquiry into or diagnosis of the causes of the present situation. However, it is useful to bring together the diverse opinions and points of view which have been expressed on the subject. This helps us to view them against the background of the present emergency and the new emphasis on and the need for science and technology in agriculture.

2. The ultimate focus of agricultural administration is the farmer of India. Our plans, our programmes are all motivated by the objective of reaching — in time — to the cultivator adequate quantities of inputs and incentives, in order to draw from him the response which would benefit him and the consumer. As a result of the rethinking that has arisen from the serious crisis that has overtaken us in the field of agriculture, certain clear lines of action have been laid down in the last year or so. While the top levels of the hierarchy, both in the Centre and the States have been reacting to this problem, I am rather seriously distressed at the fact that the administration at the lower levels has still not responded adequately to the challenge. This is not the fault of individuals, so much as it is a fault of the system.

3. Take the Village Level Worker who is the most crucial agency in the whole administration of extension. There is a confusion in our minds even now as to the role and functions of the Village Level Worker. Should he discharge functions as varied as the gold-bond drive, land revenue collection or should he be the essential instrument to transmit new knowledge to —and take back the problems of — the cultivator? The first question which arises is whether even if the responsibilities are clearly defined, the Village Level Worker of today is competent to handle this responsibility of transmission of new knowledge and to act as a friend, philosopher and guide on occasions of difficulty. Often opinions have been expressed, that the Village Level Worker, with his knowledge, skill and experience is not fit to discharge these responsibilities. We have to get a more competent, better trained functionary in his place. For obvious reasons, we cannot immediately fill the post of every Village Level Worker in the country with an adequately trained and competent agricultural functionary. I would suggest, however, that we should make a beginning at least in the areas in which we are attempting the special intensive programmes with high yielding varieties of grains, oilseeds and fibres.

4. We should also experiment with some new approaches in the area of ensuring an effective link with the village. A suggestion has been made that the problem lies with Village Level Extension worker who has no incentive in the spread of new technology. One way out may be to give a stake in this task to the progressive farmer of the village who has a reasonable and continuing experience of cultivation. He may be given a commission on the increased sale of fertilisers in the village or a bonus related to the increase in productivity. It is necessary that when the culti-

vator goes to his Village Level Worker for advice there should be no room for the lack of respect or confidence which arises because the Village Level Worker has neither the learning nor the practical experience which alone can equip him to be a proper adviser. It would, therefore, be desirable or even be necessary to involve in the village level extension work some of our more experienced progressive farmers. In the meiji era in Japan, agricultural associations arranged for the better agriculturists to move from village to village for discussions and sharing their experiences with the others. A cultivator who has proven in his own field the advantages of new technology is a far better advocate than a hundred Village Level Workers without the background of experience and successful operation in the field. We should take this fact into consideration. I would suggest that more use be made of those cultivators who have reaped the rewards of the new technology in their own fields. The various voluntary organisations of farmers like the Tonnage Club, are agencies which should be activised in this. We should also fully involve the instruments of mass communication like the Press, the Cinema and the Radio. I am particularly impressed in this regard by the weekly farm edition which is put out by one Telugu paper with the assistance of one of our scientists. There should be more such farm-numbers of our newspapers.

5. Talking of the problem of communication in a village, I am particularly distressed by the fact that the cooperative agency in the village functions in isolation from agricultural extension. A cooperative credit institution which functions purely as a bank lending to and recovering monies from the farmer has only an indirect interest in the spread of new techniques. If there is any place where agricultural

technicians are needed, I would say they are needed most in the cooperatives in the villages. The new opportunities that arise from the spread of new seeds, new varieties of fertilisers, new pesticides, should be exploited by our cooperative movement. It must become a part of the cooperative management structure that there should be an infusion of agriculturally trained men at various levels of the cooperative hierarchy.

6. I am aware that a number of papers before this Seminar propose to discuss how to activise management of cooperatives in the cause of agricultural change. Experience shows that one of the most effective forces for agricultural change in our country as in others is the force of the market. For instance, a well developed market for milk in Khaira District has done more to increase the number of good cattle in the district than years of activity by animal husbandry technicians. It is precisely because of the power of the market and price incentive that this development has taken place. Similarly, if in recent months and years there has been an increasing awareness of the need for fertilisers, new varieties of foodgrains and so on, it is precisely because the farmer knows that he will get an adequate return for his crop and that there is good demand for it. We have to exploit this economic factor in our favour.

7. A beginning is being made in some of the districts of Andhra Pradesh with a scheme to advance fertilisers, pesticides and seeds against a contract for sale to Government or Governmental agency. I understand that a similar scheme is being adumbrated in Maharashtra State also. This is of crucial importance as an innovation in agricultural administration. A barter of fertilisers for grain is the surest way in

which the farmer can be encouraged to take to fertilisers and at the same time Government can ensure him a market for grain at reasonable prices. I think the cooperative movement of the country which is today hide-bound and does not attempt any innovations should break lose from its intellectual stagnation. It should boldly experiment with the new approaches to the problems of the current agricultural revolution. It is unfortunate that there is a tendency in those who lay down the law for the cooperative movement to view it more as a problem of banking than as an instrument of agricultural change. I believe basic changes are needed in the structure and procedures which control the flow of agricultural credit. This is too big a subject on which to venture observations in detail in this Seminar. I would however make one observation that so long as the present tendency to keep credit and marketing in water tight compartments continues, there is no healthv future for the cooperative movement. Even historically, credit and market have always gone together. That is the way the money lender has flourished in all backward societies. If the cooperative movement has to replace him and ensure adequate credit at reasonable rates of interest, it can do it only on the basis of a proper integration of credit and marketing. I hope that in the days to come, we will be able to give the needed new orientation to the cooperative and other credit organisations in the country.

8. Before I conclude, I would like to touch on the relationship between research and the field. For too long, there has been a feeling that research in India is an ivory tower function. From my knowledge of research workers and research work, I can assure this gathering that they have been functioning quite closely and in response to the demands of the situation. If the new fruits of research have to be

transmitted to the cultivator it can happen only if the cultivator can be assured that the research worker will be available to solve his problems when they arise. From this point of view, I commend the work done by some of the research workers of the Indian Agricultural Research Institute in organising demonstration work in the nearby village of Jounti. I hope and trust that the research stations of the State Governments will also develop a similar vital and organic link with the problems of extension and the farms in the nearby areas.

9. I am glad you are discussing the important problem of Union-States relationships. Ultimately, the responsibility for implementation of agricultural plans rests with State Governments. The Centre can only act as a guide and if I may so put it, as an instigator of new changes. It can offer the carrot of grants and loans. In a permissive federal State like India, resort to sanctions is not only undesirable but unnecessary. We have to work within the constraints of the federal system and to see that the State Governments and State administrations are motivated by the same incentives to progress as the Centre. It is, in fact, an illusion to think that the States are not as eager as the Centre to make an advance. I would put it that some of the States want to move much faster than the Central Administration is prepared to move. It is part of the process of democracy that we have to make adjustments and take the laggards with us but in this process we should see to it that those who want to proceed faster are not held back. We are evolving memoranda of understanding between the States and the Centre which would in a large measure enable a clear definition of responsibilities and obligations of the Centre and the States in the various agricultural development programmes. I am

hoping in due course this will become a useful instrumentality in agricultural development.

10. With these few words, I have great pleasure in declaring open this Seminar. These is indeed a feast of thought and reason in the papers that have been spread out before you. I hope that the deliberations will be fruitful and will enable the emergence of concrete measures for the improvement of agricultural administration in the country.

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For Participants Only

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AGRICULTURAL ADMINISTRATION

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PLANNING FOR AGRICULTURAL DEVELOPMENT

By
Dr. S.R. Sen
Adviser,
Planning Commission.

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PLANNING FOR AGRICULTURAL DEVELOPMENT

The development of agriculture involves the development of the human as well as material resources. The former involves the creation of a "will to develop" among the farmers and adoption of measures calculated to bring about a progressive improvement in their incentive, skill and efficiency. The latter involves a progressive development of the infra-structure and improvement in the material conditions for production. The two together create the appropriate climate and environment for development, besides contributing directly to the development process itself.

2. Development of human resources can be brought about partly by the implementation of general social and economic policies, e.g. land policy, price policy, trade policy, incentives, etc. and partly by provision of education and training, extension services and research. Improvement of material resources involves measures like land reclamation, land development, soil conservation, afforestation, irrigation, drainage, supply of fertilisers, pesticides, implements, better seeds, credit, etc.

3. What combination of various measures designed to improve the human and material resources will lead to the optimum result will depend upon the overall resource situation, as also the general strategy of development.

4. The main considerations in determining policies and programmes for the development of agriculture may be briefly summed up as under:

i) optimum utilisation of the resources endowment of the country from the short term as well as long term point of view;

ii) meeting the urgent requirements of agricultural products and achieving the desired targets of production; and

iii) setting in motion a process, especially through the progressive application of science and technology, which will lead to continuous and sustained improvement in the agricultural productivity of the country.

Of these three, it is really the last which constitutes the core of the basic strategy for agricultural development.

5. Policies and programmes for the development of agriculture cannot however be considered in isolation from the policies and programmes for the development of the economy in general. For instance, industry processes agricultural products and provides the fertilisers, pesticides and implements, that it needs while agriculture supplies food and raw materials to industry and provides market for its products. Provision of transport, communication and power is essential for the development of both.

6. In considering the plan of economic (including agricultural) development, it is important first to take a long look ahead and have some idea of the perspective of development and second to determine a strategy of development before taking a look at the programmes for the next operational period.

7. Development is a continuous process and a plan for development for, say, the next five years, must keep in view the needs and possibilities of a longer period, say the next ten or fifteen years. Planning, as opposed to laissez faire or a policy of drift, must have a long term goal (i.e. a perspective plan) before a view is taken of the stages (i.e. five year plans) by which that goal will be reached or of the detailed itinerary for each of the different periods (i.e. annual plans) in which a particular stage is to be covered.

8. Careful marshalling of facts and their scientific study for the purpose of formulating judgement are essential pre-requisites for determining the broad strategy for the development of the economy as a whole. The strategy may be either balanced growth or unbalanced growth. For a small country participating actively in international

trade, unbalanced growth may sometimes give a higher growth rate. But in a continental type of economy facing serious constraints regarding exports, balanced growth seems unavoidable. For such a country, maximisation of the rate of growth of the production potential may be a more desirable course than the maximisation of the rate of growth of national income, at least in the initial period.

9. Within the broad strategy determined in the light of the political, social and economic considerations, the strategy as well as the plan for the development of agriculture over a given period, say five years, will depend on (a) the rate of growth of national output aimed at; (b) the place given to agriculture in the overall strategy for the development of the economy; (c) the linkages envisaged between agriculture and other sectors, e.g. industry, transport, etc. (d) the investment proposed for the latter; (e) the current stage of development of the infrastructure, especially of items having a bearing on agriculture and the programmes for their future development; (f) the feasibility of extending the area under agriculture; (g) the rate of improvement of the agricultural productivity in different subsectors, e.g. crop production, animal husbandry (pasture and fodder production), dairy, fisheries, forestry, etc. considered technically and economically feasible and (h) demands for agricultural products which have to be met immediately, over the next five years and over the perspective period.

10. The pattern of investment in agriculture has not only to take care of immediate short gas but also to create production potential for the future. If the latter is not attended to, there may be a quick increase in production in the short run, only to be followed by stagnation in the long run.

11. Generally speaking, the pattern of investment in agriculture will have to be (i) in terms of broad sectors, e.g. crop production, animal husbandry, dairy, fisheries, forestry; (ii) also functional,

e.g. improvement of institutional structure, general improvement of production potential, improvement of productivity of particular products and (iii) all these again will have to be a mixture of regional (or intensive) or countrywide (or extensive) programmes.

II

12. If the best use is to be made of the limited resources available, intensive regional programmes are likely to be the most economic and efficient in the short run. But for political and social reasons, the rest of the country cannot be completely kept uncovered nor would it be desirable from the point of view of the long term development of the country. A good way of resolving this difficulty may be to make a judicious combination of the intensive and extensive approach by adopting, say, a three tier pattern of development. The first tier comprises few selected districts (or regions) which serve as it were as the "pathfinders" and "pace setters" where most intensive effort is put in and where the latest lessons of science and technology are tried out by the best available personnel and with all the investment needed so as to achieve a break-through. For each district (or region) in this tier a special package of not only of practices but also of works is provided in the light of its specific needs and with the objective of producing just that impact as is calculated to produce the optimum result. The second tier covers somewhat larger number of districts (or regions) where the programmes which have proved successful in the first tier are tried out in a somewhat more extensive but less intensive form determined mainly by the availability of human and material resources. The main objective in this tier is to follow up the break-through achieved in the first tier and benefit as large an area as possible from the successes achieved by the first tier and at the same time avoid the mistakes of the latter. The third tier comprises all the other districts (or regions) of the country where the effort is relatively thinly spread and investment is conditioned by the general

availability of resources after providing adequately for the first and second tiers. It may be clarified that there is likely to be considerable variation within each tier, depending on the nature of the area under consideration. An intensive programme for an area suitable for, say, staple crops will be obviously different from that for an area suitable for, say, animal husbandry.

13. There should be a gradual movement over time from the third tier to the second and from the second tier to the first. Since the main objective of the first tier is to carry out bold experiments and take calculated risks, there must be failures as well as successes but as in any scientific experiment the negative results are usually as valuable as the positive results and should be counted as the price that has to be paid for the progress aimed at.

14. At first sight it may appear that the intensive projects in the first tier are essentially the same as the pilot projects carried out by the research institutes. But there is an important difference between the two. The pilot projects are mainly technological experiments, while the intensive projects are technological cum administrative experiments. The former aim mainly at testing out in the field results obtained in the laboratories. The latter aim on the one hand at trying out in a much wider area the results obtained in pilot projects not only in their technological aspects but also in their administrative aspects and on the other hand at overcoming the various socio-economic obstacles which stand in the way of progress and at overcoming them and clearing the path for others to follow. Both the number and location of the intensive projects, especially those in the first tier, should therefore be selected with the greatest possible care and kept well within the limits of the trained personnel and key material resources that may be available.

15. In India there has been a gradual change from the extensive approach to the intensive approach in the matter of agricultural development over the last two decades. The Grow More Food campaign

nor socially desirable to neglect altogether the rest of the country. The question is what should be the right proportion of intensive and extensive projects and what should be their relative size and intensity. No simple answer is possible. It is in the light of the general objectives of economic development, the overall availability of resources, the minimum needs of development of different areas and the potentialities of the more promising areas that the ultimate decision has to be taken. But a clear recognition of the fact that the optimum results cannot be achieved through a uniform pattern of development for the whole country, that different patterns have to be prescribed for different areas and that a few programmes have to be very intensive so as to figure in the first tier, a somewhat larger number has to be in the second tier to follow up closely the successes achieved by those in the first tier and the programmes in the third tier have to cover the whole of the country somewhat thinly is essential for rapid development. It is also important to recognise that the requirements of resources, human as well as material, so far as the three tiers are concerned are different not only quantitatively but also qualitatively. An extension worker good enough for the third tier will not be able to tackle the problems of the second tier and an extension worker in the first tier has to be much more sophisticated than his counterpart in the second tier. The levels of expertise and the programmes of training have therefore to be planned accordingly. Besides, the institutions for credit, marketing, etc. may have also to be designed differently for these different tiers. In fact there will have to be much greater administrative innovation in the first tier than in the second and similarly in the second than in the third, and the investment patterns and administrative methods have to be modified promptly as an area develops technologically and economically.

17. So far we have dealt with the question of general strategy for agricultural development. The next question is how one should set about formulating a plan for agricultural development, once the broad strategy is agreed upon. Since the general pattern of investment for the economy as a whole and the pattern of investment in agriculture are closely interrelated, considerable forward and backward exercises will be needed before the final results can be obtained. For the first exercise in preparing a plan for agricultural development, one may usefully start with certain broad magnitudes, e.g. growth of population and national income, rates of saving and investment, proportion of investment available for agriculture and its important sub-sectors as given by the general planners in the light of overall socio-economic considerations and the broad objectives of development laid down by the political authorities. It should be, however, borne in mind that some of these broad magnitudes given by the general planners may require revision after the agricultural planners have undertaken their exercises and that the final picture both of the general plan and the agricultural plan will emerge only after a process of successive approximation has been gone through.

18. An agricultural plan may have, no doubt, several objectives but its main objective is to step up agricultural production to certain levels considered optimum from the overall point of view. Agricultural production can be stepped up partly through extending cultivation to new areas and partly by improving the yield per unit of area and animal. So far as extension of area is concerned the claims of forests, pastures, crop production, fruit production, etc. have to be considered in a related manner. In the interest of a balanced development of the economy it is essential to ensure a balanced land use. The first step in agricultural planning is therefore to divide the country into a number of regions, each considered broadly homogeneous from the agricultural point of view. It will be convenient if these regions

comprise groups of administrative units like districts except where even a district may have to be subdivided because, say, some blocks are hills and others are plains. The next step is to prepare a balance sheet of land utilisation (as in Table I) for these agricultural regions as well as for the country as a whole. This should be followed by an attempt to forecast the position that is likely to obtain at the end of the plan period if no special measures were taken to disturb the natural trend in land utilisation and thereafter to consider to what extent the natural trend requires adjustment and what steps have to be taken to bring about these adjustments. So far as the land utilisation is concerned the main decision will be regarding (a) the desired allocation as between forests, pasture, and crop farming; (b) the proportion of irrigated area and unirrigated area; and (c) extension of multiple cropping in irrigated area, first for the country as a whole and then for each region keeping in view the needs of the overall economy.

19. The next important exercise would be to decide upon the crop pattern and to set targets for individual agricultural products. In this exercise one can start either from the stand-point of demand or from the stand-point of production potential.

20. In estimating demand a distinction has to be made between demand (a) for final consumption goods; (b) for intermediate goods e.g. raw materials for domestic markets and (c) for export markets. So far as the final consumption goods are concerned, estimation of demand is to be made on the basis of (i) population trend (ii) increment and distribution of income; (iii) income elasticity and (iv) considerations regarding nutrition and likely or desired changes in taste. So far as "intermediate goods" are concerned, the estimate has to be made through techniques of "derived demand" analysis. So far as export demand is concerned a view will have to be taken of the likely trend of world income and trade, production plans of other countries, trade policies, export promotion measures, etc.

21. So far as the projection of supply is concerned, the first step would be to prepare a balance sheet of gross area (as in Table II) sown as a counterpart of the balance sheet of land utilisation. The balance sheet of gross area sown should give figures separately for irrigated and unirrigated areas for the important crops grown in the country. The next step will be to tabulate (as in Table III) the data regarding physical response (in terms of "production functions" or "yardsticks") and cost benefit ratios for different inputs or combinations of inputs available from experimental farms, case studies, or sample surveys for different homogeneous agricultural regions. This should be followed by projections of acreage, unit yield and production for each crop separately, for each agricultural region and also for the country as a whole (as in Table IV). If necessary, account may be taken of different combinations of desired practices or programmes. Thereafter consideration should be given to whether the policies that are in vogue or are proposed to be adopted will yield the results that are implicit in the production functions (yardsticks) used. If the policies are considered to be not conducive enough, some deduction should be made at the end on the basis of judgement of experts. If the policies are considered to be even more conducive than are implicit in the production functions assumed so that the initiative, enterprise and efficiency of the farmers are likely to be even better than the projections show, some additions again on the basis of judgement may be made to the projections. In this exercise it is very important to make adequate allowance for gestation lags and also for possible slacks and inefficiency in plan implementation.

22. The supply projections thus obtained should be compared with the demand projections and if there are serious imbalances in so far as particular crops are concerned, alternative ways of meeting these imbalances will have to be considered. At this stage comparative costs of various alternatives, inter-crop, inter-regional as well as international, should be carefully looked into. In some cases it may be

more economical to meet the shortage by import from some other countries and pay for the same by deliberately producing a surplus of some other commodities in which the country enjoys comparative advantage. The projections thus obtained should be tested for (a) acceptability, (b) feasibility and (c) consistency through judgement of experts and where necessary, pilot studies. If the tests reveal any imbalance or difficulty these should be corrected by repetition of the process of backward and forward exercises mentioned earlier.

23. In view of the uncertainty of weather and prices as well as the other difficulties which are inherent in programmes for agricultural development, it may be useful to fix targets in terms also of (i) a range of outputs or of (ii) average output for five years and of (iii) inputs. An attempt may be made to take care of annual variations of output through buffer stock operations and through trade. There is a view that in a country with a mixed economy which actively participates in international trade, targets of outputs of individual crops are really less meaningful than the targets of agricultural productivity - especially from the long term point of view. So long as agricultural productivity goes on improving, it does not matter very much from the point of view of development how the crop pattern behaves so long as necessary adjustments are possible through trade - inter-regional as well as international. It may be therefore useful to prepare an index number of agricultural production with component indices of area and unit yield and fix targets on the basis of these indices also. Individual crop targets will, however, become relatively more important to the extent that adjustment through international trade becomes difficult for a country on account of constraints on exports and imports.

24. A possible alternative approach may, no doubt, be to set production targets from the village upwards instead of the country downwards. In practice, however, it is likely to be very difficult in a country like India where the villages number more than half a million.

However, even if only a small sample of villages prepare local plans, this should give a valuable indication to the planners of the preferences of the farmers and the inputs needed by them in the light of which some adjustments may be made in the overall plan prepared from above. In practice, the planning procedure as has been evolved in this country is essentially a backward and forward exercise between the Planning Commission and Agriculture Ministry in the Centre and the planning and agricultural departments in the States. The district and block authorities, who are in closer contact with the villages, are, however, playing an increasingly important role in successive plans.

25. Once the five year plan has been prepared it will be necessary to review the position from year to year and make readjustments in the targets and programmes through the medium of annual plans. From the operational standpoint, the annual plan is even more important than the five year plan in as much as the annual budget and programme of work are based on the annual plan. And it is also through the annual plan that the desired phasing of long term programmes over the five year period is ensured.

IV

26. The "plan of investment" thus prepared should have as a counterpart a "plan of implementation" in terms of organisation, personnel, training, direction, co-ordination and supervision. While the plan of investment will provide the physical inputs, the plan of implementation should ensure the administrative inputs. A good investment programme may be undone if administrative arrangements are poor. On the other hand, sound administration may salvage a relatively poor investment programme and may secure even better results than the plan targetted for. Close touch with the operations at the field level and readiness both to adjust patterns and procedures to the needs of the farmers and to undertake new experiments where the situation so demands are essential prerequisites of a good plan of implementation.

27. In any plan, investment patterns are, no doubt, important but even more important are the human elements -- firstly the farmers who have to produce the results in the ultimate analysis and who have to be not only enthused, but also progressively made efficient, and secondly the officials from the V.L.W. upwards through whom the message of the plan, the technical know how and the supplies, have to be transmitted to the farmers. The training of extension workers and farmers and the organisational aspects of agricultural extension, the administration of specific programmes of agricultural development and ultimately the union, state, field relationship which are to be discussed in subsequent sessions of this seminar are therefore of paramount interest in any consideration of planning for agricultural development. But equally important is the question of providing both the farmers and the agricultural officials with the right kind of incentives. In this context the provision not only of production requisites but also of incentive goods and services to farmers and price policy, marketing policy, credit policy, land policy, education policy and wage policy deserve special attention. In fact in a country like India where agricultural development depends upon the motivation and capacity of millions of small farmers, policies are no less important than programmes as both the urge for production and the allocation of land, labour and capital as between alternative uses are largely dependent upon the former. In any planning for agricultural development, therefore, due emphasis has to be given to both.

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TABLE I

BALANCE SHEET OF LAND UTILISATION
(hectares)

	Past Years I, II, III, etc.	Base Period	End of perspective plan	End of 1st plan
1. Geographical area				
2. Forests				
3. Land under three crops and groves				
4. Permanent pastures and grazing lands				
5. Other lands not available for cultivation				
6. Arable land				
7. Net area sown :				
(a) irrigated				
(b) unirrigated				
8. Gross area sown, i.e. cropped area including multiple cropping :				
(a) irrigated				
(b) unirrigated				

TABLE II

BALANCE SHEET OF GROSS AREA SOWN

(hectares)

	Past Years I, II, III etc.	Base period		End of 1st Plan	
		Irrigated	Unirrigated	Irrigated	Unirrigated
1. Rice					
2. Wheat					
3. Cotton					
4. Coffee					
5. Fodder crops					
6. etc. etc.					

TABLE III

	(a) Area Benefited (ha)	(b) Labour employed (no)		(c) Output		(d) Value added		(e) Surplus (value added-wage bill)		(f) Gestation period
		(i) Construction	(ii) Recurring	(i) Quanty total per ha.	(ii) Value total	(i) Total	(ii) per 100 dollars invested	(i) Total	(ii) per 100 dollars invested	
1. Land reclamation (mechanised) and settlement										
2. Land reclamation (non-mechanised)										
3. Soil conservation										
4. Irrigation (major)										
5. Irrigation (minor)										
6. Nitrogenous fertilizers										
7. Other fertilisers										
8. Manures										
9. Improved seeds										
10. Mechanised cultivation										
11. Combination of 5,6,7,8,9										
12. Combination of 4,6,7,9,10										
13. Package programmes										
14. Practices (including input combinations, plant protection measures, etc. of good farmers										
15. etc. etc.										

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TABLE IV

	Crop: Rice	
	Base Period	End of 1st Plan
I. Acreage (ha.)		
1. IRRIGATED		
1.1 With improved seeds, fertilizers and manures		
1.2 With improved seeds and manures		
1.3 With ordinary seeds		
2. UNIRRIGATED		
2.1 With improves seeds and manures		
2.2 With ordinary seeds		
TOTAL		
II. Yield rate (in kilos per ha.)		
3. IRRIGATED		
3.1 With improved seeds, fertilizers and manures		
3.2 With improved seeds and manures		
3.3 With ordinary seeds		
4. UNIRRIGATED		
4.1 With improved seeds and manures		
4.2 With ordinary seeds		
III. Production (tons)		
5. IRRIGATED		
5.1 With improved seeds, fertilizers and manures		
5.2 With improved seeds and manures		
5.3 With ordinary seeds		
6. UNIRRIGATED		
6.1 With improved seeds and manures		

For Participants O-ly

AA I/2.

SEMINAR

on

AGRICULTURAL ADMINISTRATION
(March 9 - 12, 1966)

AGRICULTURAL EXTENSION

by

D.V. Reddy,
Ageicultural Extension Commissioner,
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AGRICULTURAL EXTENSION

I

Agricultural Extension is essentially an educational process through which farmers are trained to help themselves. It aims at the development of the farmer and his family by inducting and guiding them in the best tillage practices and fullest utilization of the advances made by science and technology and by motivating them to take desired actions. Increasing agricultural production to meet the enormous requirements of food and fibres of our fast growing population is a stupendous task. Agricultural production takes place in the fields of over 60 million farmers scattered all over the country. The majority are illiterate and follow traditional ways of farming. The yields of most of our crops are among the lowest in the world. During the period covered by the first three Five Year Plans it has been possible to achieve a linear rate of growth of only about 2½% per annum. A rate of growth of 6% during the Fourth Five Year Plan is necessary if the country is to become self-sufficient in food grains by the end of 1970-71. A massive agricultural extension effort to achieve a break-through in the adoption of improved techniques of farming by our farmers is needed.

There is no short-cut or easy way of modernizing a traditional agriculture. This is the lesson of the experience of all developed countries which have made any significant progressive agriculture e.g. Japan, U.S.A., or Taiwan. The use of more fertilizers, green manuring, improved seed, plant protection measures, more research etc., in isolation yields little result. The recent experience of Intensive Agricultural Programme has demonstrated that maximum results in terms of increased production can only be achieved through an effective combination of the various inputs backed by a strong extension effort.

Agricultural extension efforts have undoubtedly lagged behind the expectations raised in our Five Year Plans. Some of the major impediments to effective extension appear to be:

i) Problem of administrative coordination in the working of several department concerned with agricultural production leading to dual control over the field extension agency.

ii) Inadequacy of extension personnel resulting in unmanageable area of operation and ineffective contact with farmers.

iii) Lack of technical competence and skill on the part of field workers.

iv) Inability to back extension efforts with adequate and timely supply of inputs.

v) Absence of adequate motivation of both the extension personnel and the farmers.

vi) Failure to make full use of the various techniques of individual and mass communication.

vii) Lag between research and extension.

II. Administrative Coordination

The launching of the Community Development Programme in 1952 marked the beginning of an integrated approach to rural development. It was recognised that the economic aspects of village life cannot be detached from its social aspects and agricultural improvement is inextricably linked up with a whole set of social problems. All aspects of rural life are inter-related and no individual aspect can be dealt with in isolation. The programme which began modestly with 55 Projects in 1952 now covers the entire country with 5249 blocks.

The Community Development Block with a staff consisting of the BDO supported by Extension Officers in Agriculture, Cooperation, Animal Husbandry, etc. and 10 V.L.Ws., has become the unit for planning and implementation of all programmes in agriculture as well as in other fields. The responsibility for planning and technical supervision, however, rests with the individual development departments in the State. Besides the Agriculture Department which is primarily responsible for agricultural development, there are other departments in the State like Community Development and Panchayati Raj, Cooperation, Irrigation, etc. which are also intimately concerned with agriculture. For example, it

is the responsibility of the Department of Cooperation to service agriculture with sufficient credit, supply and marketing through cooperative institutions. Similarly the Irrigation Department has to arrange for the timely supply of irrigation water which is the most important factor contributing to increased crop yields.

The lack of proper coordination in the working of these departments at the State, regional and block levels has been one of the major problems retarding the growth of agriculture over the past decade. At the State level there is no organic link between the various development departments concerned with agricultural production and this is reflected all along the line down to the field level. Under the Panchayati Raj set-up the B.D.O. who is the chief executive of the Panchayat Samiti works under the control of the latter body. He, in turn, controls, the activities of the Extension Officers and the VLWs in the block. The extension Officer, on the other hand, is generally a projection of the Agriculture Department of the State and works under the technical and administrative control of the District head of the Department. Though the main functions of the A.E.O. relate to agricultural production, his control over the V.L.W. is not well defined. The administrative control over this key functionary is exercised by the B.D.O.

The Working Group on Inter-Departmental and Institutional Coordination of Agricultural Production (the Ram Subhagh Singh Committee) reviewed the existing arrangements and suggested measures for bringing about adequate coordination within the entire administrative and organisational structure from the village to the state level. It suggested the integration in one department all the departments and agencies concerned with agricultural production and Panchayati Raj under a <u>Commissioner for Agricultural Production and Rural Development.</u> The Commissioner should be a sufficiently senior officer assisted by a Special or Additional Secretary heading individual development departments. It also recommended the establishment of <u>Coordination Committee</u> at different

sought to be avoided by placing the Extension Officers on the cadre of the respective technical departments but having his character roll initiated by the B.D.O. and forwarded to the District Agricultural Officer and by placing the V.L.W. under the administrative control of the A.E.O. (who will initiate his character roll). To secure effective control over the B.D.O. which has hitherto been lacking, the Committee suggested that the District Agricultural Production Officer should write the confidential report of the B.D.O. after consulting the District Officers of the other technical departments and should also have the powers to transfer the B.D.Os within the district.

This aspect requires serious consideration in view of the present status, scales of pay, etc. of the B.D.O., vis-a-vis the D.A.O. If the B.D.O. has to play an effective role in the development of the block, he should be of sufficiently senior status to command the respect of the team of extension officers and also secure proper coordination between the official and non-official agencies. Considering this the status of the B.D.O. has already been raised in some States.

It also follows that if the DAO has to discharge his responsibilities properly, there should be a corresponding rise also in his status. He should, therefore, be a class I officer with adequate power to supervise and control the work of the BDOs. Some of the States have already given a lead in this direction by raising the status of DAOs to Class I.

The measures suggested by the Working Group to ensure proper administrative coordination between the various departments and agencies concerned with agricultural production and a single line of control over the block extension agency responsible for the implementation of the agricultural production programme in the field have been accepted by the States. Some of them have given effect to the suggestions and as a result coordination in the working of the VLW, AEO and BDO has been improved.

With the advent of the Panchayati Raj institutions non-officials have been brought into the field of agricultural development programmes

at different levels. These bodies have been designed as the principal instrument for executing rural development programmes in different spheres and vested with wide powers. In this context, proper coordination between the non-official institutions and the existing official extension machinery becomes imperative. The technical staff at the district level and the extension staff at the block level have assumed the role of technical advisers to the Zila Parishads and Panchayat Samitis respectively helping them in arriving at correct policy decisions regarding the planning of agricultural programmes and distribution of supplies, loans, etc. This is no doubt a difficult and delicate task and requires, tact and resourcefulness on the part of the extension personnel.

The VLW was conceived as a multi-purpose worker when the community development programme was initiated. Even at that time it was visualised that the VLW would pay greater attention to agricultural production. As the problem of food supply became more and more important, it was realised that this vital functionary should devote himself wholly to the implementation of the agricultural production programmes and the Union Ministry of Community Development and Cooperation issued instruction to State Governments that the VLWs should in future devote themselves only to one set of tasks, namely, organising extension and supplies for agricultural production programmes and helping panchayats to draw up and execute village agricultural production plans. Experience has, however, shown that State Governments have not been able to implement this directive effectively and the VLW still devotes a part of his time to non-agricultural work like the collection of taxes, social services and other functions. This situation should be rectified, particularly in the context of the intensive agricultural programmes which have been taken up on a large scale and cover about 1/5th of the total cultivated areas of the country. These programmes demand the whole time attention of the VLW to enable him to establish contacts with the farmers in his jurisdiction and ensure

need to be appointed at the village level to relieve the VLWs of their non-agricultural work. In the areas where Panchayats have provided an officer for the purpose the VLWs have shown better performance.

III. Inadequacy of Extension Personnel

On the major lessons of the operations of the Intensive Agricultural Programme is that unless the VLW and the AEO are put in charge of responsibly manageable areas, where they can establish close personal contact with each cultivating family the effective implementation of agricultural production programmes is not possible. The jurisdiction of a VLW is spread over an area of about 5,000 acres, having nearly 1200 farming families. As against this, in Japan, where the means of transport and communication are highly developed and the level of literacy of farmers is also much higher than in our country, Farm Extension Adviser has to deal only with about 550 farming families cultivating less than half the area. In addition there is an equal number of qualified and well trained Farm Advisers (extension workers) maintained by cooperative organisations. The work load of the VLW at present is too heavy for him to do effective extension work in his area and assist the farmers in the adoption of improved techniques of production. Similarly the areas of operation of the Extension Officer in the block is unmanageable. These shortcomings were taken into account in planning the intensive agricultural programmes (Package Programme) where the extension set-up has been strengthened by addition of 10 VLWs and 3 to 4 AEOs in each block. If farm planning and all the other activities have to be intensively planned and executed over the entire area the number of VLWs and AEOs should be increased.

IV. Lack of Technical Competence and Skill.

The effectiveness of the VLW and the AEO as extension agents depend largely on the extent to which they are able to convince farmers of the need for improved technology and to wean them away from traditional agricultural. If this job is to be accomplished extension personnel

.....should have both qualifications and competence. The VLWs in most cases are matriculates (in some states, non-matriculates). They have undergone a training ranging from six months to two years. Though agriculture has been given the main emphasis during the training course, still due to the large number of subjects that have to be taught and the inadequacy of practical or other training at the Gram Sevak Training Centres, the VLWs are not often fully equipped to meet the obligations in the field. This deficiency has come into sharp focus in the areas covered by the intensive agricultural development programmes where they have been called upon to render a higher level of technical guidance to farmers in the preparation and implementation of farm production plans. This aspect has been considered by several committees in the past. It has been suggested that all the VLWs should be gradually replaced by agricultural graduates over a period of time, and that during the Fourth Five Year Plan period at least the VLWs posted in the intensive agricultural blocks should be replaced by agricultural graduates and that this process should be extended in the Fifth Plan so as to cover the entire country.

While the above recommendation is certainly an ideal to be aimed at, in practice it may not be possible to find graduates in adequate number due to (i) the limitation of the capacity of the existing agricultural colleges to turn out the required number of graduates and (ii) the ineligibility of many of the VLWs. now in service for admission to degree courses in universities.

In the circumstances, the following course of action may be adopted to improve the educational qualifications of extension workers:

(i) All future vacancies of VLWs should be filled up from graduates in agriculture.

(ii) The eligible VLWs should be deputed for a degree course in a phased manner.

(iii) A special diploma course may be initiated in selected agricultural colleges and Rural Institutes to train the other VLWs for a diploma course.

(iv) Graduate VLWs should be eligible for promotion to higher posts including those of district officers. The diploma holders on the other hand should be eligible for higher jobs like the AEO on the technical side and BDO or other similar posts on the administrative side after they gain sufficient experience. The above will serve both to increase their competence and to provide them the necessary incentive.

(v) Similarly with the farmer in need of a higher level of guidance the AEOs at the block level and Subject Matter Specialists at the district level should be enabled to acquire greater specialisation in their work.

Training of Extension Workers

One of the major experiences of the intensive agricultural programmes has been that the extension personnel need a continuous "on the job training", oriented to the needs of the programme. Such training will help build up adequate skill and competence. For all categories of extension personnel at the field level, pre-entry, in service and refresher training at an adequate standard should be provided.

a) Pre-service training: The quality and extent of the pre-service training imparted in both agricultural colleges and Gram Sewak Training Centres is not often upto the mark. It should be improved and trainees given adequate practical bias by allotting specific plots (either for each VLW or for a group of VLWs) and making them fully responsible for their cultivation and the returns. The trainees should also be brought into touch

with extension problems in the blocks attached to their institutions to give the training a field orientation.

b) In-Service Training: A fresh graduate requires some experience in the field before he can take independent charge and enjoy the confidence of the farmers. This experience can be gained only by adequate in-service training under a more experienced extension officer. It is suggested that every new graduate or VLW posted to the field must be trained for at least a period of six months with a view to giving him the necessary self-confidence and familiarity with local agricultural problems which he is to tackle.

a) Refresher Training: In view of the rapid growth of agricultural science and technology, it is necessary to organise periodical refresher courses for different categories of extension personnel. The evolution of high yielding varieties of crops and the recent advances in plant protection and fertilizer technology etc. emphasise the need for continuous training.

Such training and orientation are necessary not only for the actual field workers but also for the technicians and administrators at higher levels. The Agricultural Personnel Committee has endorsed the recommendation for the establishment of a Central Staff College for imparting in-service training to senior officers of agriculture and animal husbandry departments in the States. This suggestion deserves early implementation.

There is also need for orientation of officers belonging to the administrative and other services involved in agricultural programmes. District Collectors should be given such orientation at the training stage in the National Academy of Administration. Besides, the officers of the other departments like Cooperation, Community Development and Panchayati Raj, Irrigation, Finance, Audit etc. should also be given orientation in agriculture.

Any amount of training and specialisation will be no avail unless the officers entrusted with the responsibility for increasing agricultural production develop a rural bias and missionary zeal to promote the well-being of the village community. To be able to do this they must tour villages frequently, identify the problems and attempt to solve them on the spot, if necessary by staying overnight in the villages. Though the system of compulsory night halts exists in a number of States, in practice this does not appear to be enforced strictly. Unless the field worker spends a considerable portion of his time in the area allotted to him, his contribution to agricultural production may not be significant. It is, therefore, suggested that the regulation of night-halts and minimum tour

V. Supply of Inputs

It has been observed that a breakthrough in the adoption of improved technology has been possible only in the areas where the supplies have kept pace with the education aspects of extension, in other words where the package of practices and the package of services (including supplies) have gone hand in hand. The main inputs which the farmer requires for increasing production are improved seeds, fertilisers, pesticides and improved implements.

The latest report on "Problems of Coordination of Agricultural Programmes (1965)" by the Programme Evaluation Organisation has brought out the various weaknesses of the seed programme at the stage of the supply of breeders' stock to seed farms for production of foundation seed, certification, procurement, testing and storage. On account of these defects even at the end of the Third Five Year Plan we are not in a position to assure the supply of really good quality seeds to our farmers. The above evaluation report has recommended efficient organisation, cordinated arrangements and quicker methods and stricter enforcement of quality control with a view to ensuring the success of the seed programmes. In addition to the large number of existing varieties evolved by the States and multiplied by them many high-yielding varieties in rice and wheat and hybrids of maize, jowar and bajra have come into the field which require special techniques for their production and distribution. The following arrangements are suggested for the effective seed production and multiplication and distribution programme.

i) For the locally improved varieties, the foundation seed produced on the State seed farms should be multiplied through seed villages where close supervision and check at each stage will be possible by the extension agency.

ii) For high yielding varieties and hybrids the National Seeds Corporation should take responsibility for production

as is done at present. Their efforts can be supplemented by the State Seed Corporations proposed to be set up during the Fourth Five Year Plan in the States.

iii) In addition Joint Stock Companies should also be encouraged to take up such programmes of seed production but under strict supervision.

The adoption of the Seed Law which is on the anvil will be a major step towards the development of a sound seed policy.

In the case of fertilisers the problems which have manifested themselves of late are inadequate supply, lack of an adequate number of distribution points and insufficient knowledge about the proper use of different types of fertilizers. As a result of extension efforts over the past several years the total demand of the country has now far outstripped the total supply including imports. The Fourth Five Year Plan envisages an increase in the use of fertilizers from the present level of a million tons of nutrients per year to 4.1 million tons by 1970-71. Although the Government is taking steps to meet the growing requirements of this vital input by increasing indigenous production as well as imports, there is no escape from a position of continuing scarcity for some years to come. Measures have, therefore, to be devised to ensure the best use of this scarce resource as suggested below:

(1) As an immediate programme the use of available fertilisers should be made mostly in areas which have shown economic response to their application.

(2) With the large quantities of fertilisers that are likely to be available by 1970-71 greater attention needs to be paid to the fertilizer promotion programme intended to convince the cultivator of the potential benefit from fertiliser use. This can be done through planning a large network of demonstrations on cultivator's fields. These

demonstrations should, as far as possible, be of a composite type designed to show the benefits of fertilizer use in combination with other inputs.

(3) Fertilizer manufacturers should organise active sales-promotion programmes for their products. In a programme of sales-promotion some provisions has to be made for service after sales to cultivators to the extent possible.

(4) The Cooperatives should play a more active role im fertilizer promotion and distribution. With the increase in the margin available to the Cooperatives on fertilizer distribution, it is necessary that they should set up a larger number of sale points in the interior so as to bring fertilizers within easy reach of farmers. Where Cooperatives are weak this work should be undertaken departmentally.

(5) The idea of "selling the product with knowledge" should be popularised among fertilizer dealers and the Cooperatives. The experience of the USA and Japan shows that the dealer who attempts to sell cheap fertilizers without the requisite knowledge of their use loses ground and is gradually forced out of business. This will require some training of fertilizer use. Every packet containing fertilizer should carry a leaflet containing instructions about its use.

(6) The use of fertilizers should be based on the results of soil tests. It is natural that a specific fertilizer recommendation for a cultivator's field based on soil testing would be more convincing than the generalised recommendation for

the area, as has been proved by demonstrations conducted in the IADP districts. Therefore, measures to make the soil testing service more efficient, extensive and easily available to the farmer should receive priority. A number of soil testing laboratories have been set up in the IADP districts and many more are planned to be established in intensive agricultural areas during the Fourth Five Year Plan period. There is also a proposal to provide a net-work of mobile soil testing units to supplement the service rendered by the soil testing laboratories. In addition the enormity of the problem requires the encouragement of the establishment of private soil testing laboratories which could test and also take up other work like custom application of fertilizer in responsive areas.

Pesticides

Plant protection activities will need to be considerably stepped up during the Fourth Five Year Plan period. This aspect assumes greater urgency in the context of the intensive agricultural programmes and the programme for the cultivation of high yielding varoities. Intensive educational efforts for the adoption of plant protection measures on an area-wide basis, training of extension staff in the identification of pests and diseases and adoption of effective remedial measures, an adequate supply of sprayers and dusters for which increased demand has been generated in the country, more adequate arrangements for maintenance of plant protection equipment, including availability of spare parts and increased supplies of pesticides in short supply, should receive greater attention. The cultivators should be convinced of the benefits of prophylatic treatment through large scale demonstration. It will hardly be possible for the State Governments or Central

cropping season and it is, therefore, necessary to popularise custom spraying so that the cultivators come forward to undertake plant protection measures at their own cost.

Improved implements

The introduction of improved implements has not received the attention that it deserves. Except in isolated areas there has so far been no large scale spread of improved implements which can play a significant role in improving agricultural and in increasing production operations. Mechanised cultivation is also still in its infancy. While conceding that nearly sixty per cent of the holdings in our country are less than five acres in extent and would need to depend largely on bullock power, still on the remaining forty per cent of the area mechanization is possible. Research has, therefore, to be intensified on identifying the suitable tillers tractors for such holdings as also on bullock drawn implements to suit the requirements of small holdings.

Recent experiments conducted in the IADP areas have revealed that production can be increased by 10 to 20% by merely placing fertilizers in bands along with the seed using seed-cum-fertiliser drills. Similarly threshers, chaff-cutters, ridgers, improved ploughs etc., have also proved their usefulness. Such implements should be popularised all over the country by a number of well laid out demonstrations through special staff trained for the work. In addition arrangements should also be made for their large scale manufacture, either in state workshops or by encouraging private workshops. Service and repair facilities should also be provided at convenient centres, simultaneously with the popularisation of the new implements.

VI. Incentives

Extension efforts have to be aided by a sound scheme of incentives both to the extension agent as well as to the farmer to produce the best results.

The principal handicap from which the agricultural services have suffered in the past is low scales of pay. As a result of the recommendations of the Agricultural Administration (Nalagarh) Committee the pay scales of the employess of the agricultural departments at different levels have been revised in most of the States. In the case of some, the enhanced scales of pay are still not very attractive and do not compare well with the corresponding scales in the administrative and other technical services like Engineering, Medical, etc. with the result that agriculture has not been able to attract the best talent available in the country. The formation of the Indian Agriculture Service will no doubt act as a strong incentive and raise the morale and status of the agricultural services. For the categories of staff, namely, the BDO, extension officers and VLWs, which are not proposed to be included in the service, the State Governments, may have to consider higher pay scales so as to bring them in line with the remuneration paid to the field staff of other technical departments and also the corresponding categories of staff employed in the Government of India. Giving of advance increments and provision of opportunities for higher training which would lead to improvement in promotional prospects are other ways of rewarding good workers. The AEOs and VLWs who have done meritorius work may be deputed for post-graduate, graduate or diploma courses according to their eligibility.

The motivation of the farmer is also necessary to make it worthwhile for him to adopt improved technology. The guarantee of minimum prices considered remunerative to growers, the implementation of land reform measures and timely and adequate supply of inputs are measures which will serve to motivate farmers to maximise investment in agricultural production. Price stabilisation measures have acted as a powerful stimulant to the growth of agricultural production in other countries, particularly in Japan and the United States of America.

significant step forward. State Governments should for their part, expedite the implementation of land reform measures so as to complete them by the end of the current plan.

VII. Extension Techniques

The methods adopted by extension workers to educate farmers in improved methods of cultivation may be summarised as follows :-

1) Demonstrations.

2) Distribution of literature like newspapers, wall-newspapers, leaflets and pamphlets, circular letters etc.

3) Visual aids like posters, photographs, flash-cards, flannelgraphs, films, bulletin boards, slides, film strips etc.

4) Direct contacts through tours, songs, dramas, puppet-shows, etc.

5) Working with village leaders.

One or more of these methods can be used in individual or group action. Field studies have shown that extension workers using only the demonstration method were able to influence a little over one-third of the village families to adopt improved practices, but where the workers used demonstrations, visual aids and the written word, almost two-thirds of the families were persuaded to adopt better practices. Where most of the extension methods were employed it was possible to change the behaviour of as much as 98% of the families.

Extension workers generally feel that demonstrations are the most potent instrument of extension education as "seeing is believing". There are several kinds of demonstrations of which result demonstrations involving one or two practices and composite demonstrations involving a "package of practices"/and st- out prominently. The first category of demonstrations is laid out by extension workers all over the country in large number while the second category is laid out in the intensive agricultural areas under the personnel supervision of the agricultural extension officers and the VLWs . Experience in the

field has shown that composite demonstrations which receive adequate attention from extension workers at all levels have been uniformly successful. On the other hand, result demonstrations laid out in large numbers have not been so successful in attracting the attention of the farming community.

A recent evaluation of the impact of demonstrations made by the P.E.O. has brought out the following defects :

1) Lack of proper supervision and follow-up

2) Inadequate field training of the extension staff in conducting demonstrations.

3) Defective selection of plots.

4) Burdening the VLW with too many demonstrations which he could not effectively plan and supervise.

5) Lack of adequate cooperation from the farmer because of the absence of a complete understanding on his part of his role in the planning and implementation of the demonstration programmes.

These defects can be remedied only if there is a sound planning of the demonstration programmes followed by personal supervision at different stages. Every extension worker should be made responsible only for that number of demonstrations which he can properly organise and supervise and quality should not be sacrificed for quantity.

Experience has shown that very often the farmers attempt to use fertilizer and other improved inputs on the 'control' plots without the knowledge of the extension worker in their anxiety to get a good crop from the portion of the plot treated as 'control'. This vitiates the objective of demonstration. The very fact that the farmer is attempting to do this is an indication that he is aware, in some measure, of the benefits of the adoption of improved practices in increasing yields. While laying out demonstration plots it is desirable that there should be no insistence on having 'control' plots, for, the entire neighbouring area will in reality serve as a natural control.

In addition to the usual demonstration programme, referred to above, there is need to develop and implement the following special types of demonstrations with a view to producing a better visual and mass impact on the farming community :

1) ABC demonstrations. This has been dealt with earlier under fertilizers.

2) Whole farm demonstrations. These are necessary to impress on the farmer the overall benefits that can be got by treating the entire holding under improved practices.

3) Area-wide demonstrations. Such demonstrations will include the adoption of plant protection measures to control effectively pests, disease, rodents, etc. in a selected group of villages or a block; the development of correct water use and drainage for the command area of a tubewell or a distributary; the adoption of soil conservation measures for catchment areas, large scale demonstrations of soil correctives ameliorents etc.

4) Nation-wide demonstrations. Such demonstrations are to be laid out by research workers with a view to demonstrate the maximum potentiality of package of recommendations made by them. The experience of such demonstrations with high yielding varieties during the last one year has shown that really impressive results can be achieved by such demonstrations. The programme of such demonstrations should be expanded in the coming years.

Any amount of demonstrations will not be of much use to the farmer unless the practices recommended are also economically beneficial. He is most impressed if the benefits in terms of additional economic returns are brought home to him. It is, therefore, essential that the economics of the practices demonstrated should be an integral part of the demonstration programme. For this purpose, it is necessary that the extension workers are given proper training in the 'farm management' approach to agricultural development.

VIII. Linking Extension with Research

The administrative setup of the Agricultural Department varies from State to State and along with this the linking of agricultural extension with education and research also changes. In the States which do not have agricultural universities at present,

education and extension functions have been assumed by the Director of Agriculture. At the State headquarters, he is assisted in the function of extension education by a Joint Director of Agriculture(Extension) who is expected to act as a link between research and extension by codifying the improved agricultural practices and passing them on to the extension workers at lower levels. The Joint Director cannot perform this role in extension unless he is assisted by a team of subject-matter specialists. Some States have already taken action to appoint subject-matter specialists at the State level while many have still not done so. With a view to ensure that the latest results of research are passed on to the field workers with minimum delay it is essential that a strong farm advisory service headed by Joint Director Agriculture (Extension) with the assistance of subject-matter specialists is created in all States Agricultural Departments which do not have agricultural universities.

In the States where Agricultural Universities have come into existence the research and education activities of the Department should be taken over by the universities as quickly as possible. The Director of Extension in the University should attend to the same functions as the Joint Director of Agriculture in the State Department (Agriculture) mentioned above. The results of research should then be taken to the field through a team of subject-matter specialists appointed by the universities but working with the district staff of the respective departments of Agriculture. Such a link has been established in the Agricultural University, Ludhiana. For ensuring their close cooperation with the district staff of the Department and for facilitating coordination the subject matter specialists have been placed under the control of the Agricultural Officer. It is necessary to bring about such an arrangement wherever agricultural universities exist.

IX. Farmer Receptivity

The success of all extension efforts is to be judged ultimately by the receptivity they have been able to build up among the farmers to

farmers and increases in agricultural production will be ultimately determined by the extent to which the adoption of improved technology by the farmers is a reality.

Training is therefore important for farmers as it is for extension workers. It should aim at training farmers selected village leaders, farm women and young farmers. Besides, there should be a programme of organised tours of farmers to different areas, field days, etc.

A study of the characteristics of "Lay-Leaders" extension work carried out in some tehsils of Allahabad district (U.P.) has shown that the farmers in the age-group of 20 to 40 are most receptive to new practices. They are also in a position to translate the advice of the extension workers into action. Persons below 20 years are not in a position to get their families to accept a change as their status in the rural family and society is not conducive to such a role. But their training with the object of building them into future progressive farmers is very important. Older people over 40 have shown a greater resistance to change. Some of the other relevant conclusions of the above study are:-

1) It is the individual receptivity rather than higher education which results in the acceptance of a large number of practices.

2) Farmers with larger holdings take more easily to improved agricultural practices.

Extension agencies in India have a gigantic task. They have to assist as many as 60 million farmers in decision making. The problem in other countries like the United States of America and United Kingdom with their larger sized holdings is much simpler one as extension workers have to deal with only about 3-4 million farmers. The recent experience of intensive agricultural programmes has also shown that a switch over from traditional to scientific agriculture requires considerable extension effort to overcome the initial resistance of the farmers. Once this resistance is broken, continuous growth is possible provided the necessary incentives and inputs are made available in adequate measure.

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For Participants Only

AA I/3

SEMINAR ON

AGRICULTURAL ADMINISTRATION

(March 9th-12th, 1966)

PROGRAMME ADMINISTRATION IN AGRICULTURE

By

B. Sivaraman
Secretary
Department of Agriculture

Ministry of Food, Agriculture, Community Development and Cooperation
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AA II/3

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PROGRAMME ADMINISTRATION IN AGRICULTURE

Administration is a means to an end. Unless we are specific about the end, it is difficult to formulate the administration suitable to reach the end. At the same time, the resources and means that can be organised at a given time and place to research the end constrains the laying down of an objective beyond the means at the time. These are platitudes, but these platitudes appear to govern the programme we have to lay to ourselves for agricultural production for the next quinquennium. Increased agricultural production is the end but how big an increase and in what commodities is still a matter of differing judgements, the overall limitations being the resources we can earmark for the programme, the technical know-how and the available personnel and the great unknown, the response of the agriculturists. We may not go into the appraisal of the nature of this programme for this discussion, but proceed from the Fourth Plan formulations of the agricultural programme as accepted recently by the Government of India. This programme is in two parts. The Special Intensive Programme concentrates on 32.5 million acres (gross) by 1970-71 where the irrigation is assured for the crops or the recorded rainfall pattern of the area ensures the success of the crop. In this area, which is being selected in all the States, particularly in the I.A.D.P. and I.A.A.P. districts, a package approach of growing food crops by ensuring seeds responsive to high dosage of fertilisers, supplying fertilisers in sufficient quantity and organising pest and disease control, whereever necessary, and even as a preventive measure, is being spelt out as a National Programme. A similar Special Intensive Programme for Cash Crops, like jute, cotton and groundnut is being organised on 12 million acres (gross) by 1970-71. The second part of the programme is deliberate adjustment of the cropping pattern in areas with irrigation or a reasonably long period

grow before. These two programmes are expected to achieve substantially the increase in production of food grains and other crops targeted for in the new Fourth Plan Proposals. It is this programme, therefore, that needs the planned administration to back it.

2. The Special Intensive Programme makes certain new demands on the extension organisation. These can be analysed as follows :-

(a) In the ordinary programme or the I.A.D.P. programme the level of fertiliser use was far below the level at which the basic fertility of the soil and mutri-ent level of the soil would have led to over-use of fertiliser or to uneconomic use of fertiliser. In the programme with seeds responsive to high levels of fertilisers, the dosage is at such a high level that the basic soil nutrient level becomes important. Further even in the I.A.D.P. districts it has been found that, if the fertiliser dosage is based on the basic soil nutrient level, the return for the money spent becomes greater than in general application of average dosage recommended for the area. Soil analysis thereby assumes a special importance in the new programme.

(b) With new seeds and heavy application of fertilisers the need for rapid and effective pest and disease control becomes necessary. A luxurient crop attracts and a good soil fertility developes more pests than the ordinary crop and soil. Prompt diagnosis and prompt application of pesticides and fungicides assumes special importance in the new programme.

(c) The heavy investment in in-puts makes it necessary that the demonstration of good cultivation had to be of a high standard to convince the cultivator of the profitability of the investment. It is an accepted fact that the general level of demonstrations at present is far from satisfactory.

(d) The improved seed programme, at present, is far from satisfactory. The introduction of new varieties on a vast acreage necessitates a sound seed production programme. Whereas admixture of varieties in the seeds at present in distribution may affect production only marginally, lack of purity in the new variety may push down yields substantially and upset the entire programme.

(e) The high level of in-puts requires heavy investment in the cultivation. Even in the existing programmes credit has been a crucial factor in the success of the programme. This is much more so in the new programme. The programme administration has to provide for the reaching of finances to the cultivator in time.

3. The second part of the new strategy, viz., intensive cropping of areas which have irrigation facilities and assured rainfall, makes new demands on the programme administration. These can be analysed as follows :-

(a) Taking maximum out turn out of the irrigation facilities available, leads naturally to reduction of the period of major crops without affecting the yield seriously and to fitting in a second crop to suit the season. This requires introduction of new varieties of existing crops for the various zones under the programme.

(b) Taking the maximum outturn out of the rainfall available in the area, may require a change in the pattern of cropping itself to get full return out of even a deficit rainfall. It is observed that cropping follows the dietary habits of the people of the area and not the approach of maximum economic return out of the environments.

(c) To carry the message of (a) and (b) above to the people, and effective demonstration programme helped by an active applied research programme appears to be an important requirement.

(d) There is a good deal of wastage of water in the present pattern of irrigation which is generally protective irrigation. Intensive cropping will impose too much of a strain on the system unless supported by methods of economic use of water for a crop. This is a new science for the country.

(e) New crops and new varieties for a crop may lead to new pests and new diseases in the crops. An active pest control organisation is a 'must' till the new programme establishes itself and becomes an ordinary programme.

(f) An intensive programme requires a rush routine for cultivation operations. Time factor for agricultural operations becomes important. Existing facilities for and existing methods of cultivation will be dilatory and make the programme risky. Organisation of operations is a natural corollary.

4. Summing up, the new strategy requires support for the following new programmes :-

(a) Soil analysis and advice on fertiliser application.

(b) Economic water utilisation and advice on the same.

(c) New seeds with high purity level.

(d) Effective demonstrations based on high level of scientific and technical competence.

(e) Prompt and effective pest and disease control.

(f) Mechanisation of agricultural operations.

(g) Supporting of short-term credit for seasonal in-puts like fertilisers and pesticides and medium and long-term credit for machines.

5. The change-over in approach to the agricultural programme brings forward two areas of science where we have been found wanting. Fundamental research in evolution of new types of seeds so far has gone largely on selection from existing stock. Till recently, the powerful instruments of planned breeding have been used very modestly and only to a limited purpose. The programme of increased yield by use of seeds responsive to high levels of fertiliser application is based to a large extent on exotic plant types. A rapid acclimatization of the same to suit our local conditions without losing the characteristics which go for the yield is a challenge to scientists. The scientist is responding magnificiently to this problem. The rapid transfer of new finding to the field is a challenge in demonstration that we have to face. The other area of haziness is the problem of agricultural economics; the area of maximisation of economic yield per acre of land. The plant breeder so far has concentrated his attention on evolving a plant type which gives a maximum yield irrespective of the time factor involved in the cultivation. An intensive cultivation programme requires more careful use of the time and fitting in of several crops for maximum exploitation of the land. The breeder is responding to the new challenge. His findings have to be translated into seeds and distribution of seeds quickly, along with the knowledge of the requirements of the cultivation.

6. The new strategy as spelt out above requires a massive and close support of science and technology. It requires a level of services not so far contemplated in our agricultural programme. We shall examine in more detail later in this article the constraint of availability. Before we come to the problem, it is necessary to spell out in some detail what exactly the new approach means in men, capacity and services vis-a-vis the existing programmes of intensive cultivation. In the following paragraphs we shall try to analyse in detail the requirements of the new strategy in the important in-puts and the services.

7. Soil analysis

In the I.A.D.P. programme soil analysis has been introduced as a part of the advisory programme. A broad specification of the types of soils in the district has been drawn up and general recommendations for the type of soil prepared. The Extension Worker has been using this chart generally in advising cultivators. Pilot schemes carried out in selected villages have shown that soil analysis of individual fields of the cultivators with suitable recommendation of fertiliser application has increased returns by 25 to 30% for the same level of expenditure. With high level of fertiliser application soil analysis of individual fields and recommendation of balanced nutrient requirements for the crop will undoubtedly save both fertiliser and money. Wherever the Special Intensive Programme is introduced, soil analysis of individual fields becomes a necessity. Further, when intensive multi-cropping is attempted, the residual effect of high dosage of fertiliser for a good crop is important in saving unnecessary fertiliser application and also to some extent to decide on the follow-up crop. A good cultivator may require more than one analysis of his soil during a cultivation year. In an I.A.D.P. district the present availability of the facility may be for 30,000 to 40,000 samples a year. Intensive cultivation programme over 10 lakh acres in a district like West Godavari will require analysis of about 10 lakh samples a year. The present method of analysis is to take samples through Extension Workers and do the work free of charge. The method is dilatory. Cultivators are now realising the utility of prompt advice on soils. They are prepared to pay Rs. 2/- or Rs. 3/- per sample, i.e. the cost of an efficient service. The growing need for custom service is developing further because of the intensive programme. Recently a group of cultivators in the West Godavari district have come up with a proposal that they may be allowed to import equipment for the soil analysis laboratory and they will run a cooperative soil analysis laboratory for their members on a cost basis. The administration has to provide for the new service in the planning and take advantage of

8. Water Use

This again is a growing idea. The science is yet in an infancy in this country. Advice on individual crops can be built up but the main problem is area control. In the present state of irrigation service the individual farmer has no choice in his routine of water use or in the volume of water. Controlled water distribution has yet to be built up. The immediate problem, therefore, is to build up distribution so as to allow for control, at least, in small blocks of the command. Lift irrigation is a new weapon which can help in better planning of water for the crop. The immediate necessity is to organise water distribution in the areas where irrigation facilities have already been introduced. This is a part of irrigation planning and has to be done at the highest level by expert teams. Till area control is brought in, the individual can only plan within the limitations of the area. During the Fourth Plan the planning may not go below the area level. An advisory Cell at district level can take care of the problem now. The pressures of our unmethodical irrigation facilities will be felt by the Fifth Plan period unless we take steps to improve the routines. With this improvement individual advice to cultivators will become a necessity in the Fifth Plan.

9. Seeds

The new seed programme comprises of high-yielding paddy and wheat strains and hybrid maize, jowar and bajra. The normal Extension Programmes of Seed Production through selected cultivators with technical help from the ever-worked V.L.Ws may not give the necessary purity of seeds. The small seed farm of the Block also run by an Agricultural Overseer has the similar disadvantage of insufficient technical support. A programme of double hybrids in maize and single hybrids in jowar and bajra and the use of male sterile lines hybridization requires a high level of technical ability to control the programme. Seed certification by experts for purity of seeds has become a necessary part of the controls to ensure that only good seeds

are disseminated. Large Seed Farms controlled by high level technical experts is found to be necessary from the aspect of economy in cost and production of a large amount of seed under proper supervision. The new programme requires a specialised approach.

10. Pest and Disease Control

The Special Intensive Programme and the Crop Intensification Programme are expected to raise new problems of pests and diseases which require expert advice promptly at the field level. The A.E.O. with some orientation in pest control will find the problems beyond his understanding. The District Expert will find the magnitude of the area of operation beyond his individual capacity to handle. A good Pest Control Expert at levels below that of a district will be required to give prompt advice to the cultivator. Large-scale prophylectic controls raises problems of quick coverage of large areas with spraying and dusting with pesticides. The normal Block equipment of hand sprayers and a few power sprayers will not be enough to tackle the problem.

11. Machinery

As farming gets intensified over large areas, the available manual and animal power for agricultural operations in the village get strained. A continuous cropping programme requires quick preparation of the land after a crop. Rapid spread of mechanical equipment is the answer. The District Level Expert of the I.A.D.P. programme will find the scale of operations and maintenance much beyond his capacity. The Block Level Staff are not experts in the line and cannot help in the programme. Maintenance facilities on a huge scale, expert advice at field level in case of mechanical problems, all these pose problems of programme administration needing new approaches.

12. Demonstrations

The simple demonstrations of the ordinary programme was within the competence of a well-qualified V.L.W. The I.A.D.P. programme requires a little more competence and the question of giving a special orientation to V.L.Ws for a year to qualify him better for agriculture

was taken up. The new demonstrations require new higher technical and scientific competence. This restricts the field of workers available for the programme. Till the competence can be translated to a larger field, the problem is one of adjusting the programme and the location to the availability of workers and the centres of availability.

13. Credit

The approach to the credit, so far, has been limited to the Primary Credit Society of the cooperative movement. Supplies and marketing have remained very much of a problem and the system of co-operative organisations have still not found a satisfactory answer. The special I.A.D.P. districts are to look into overall problems of credit of short, medium and long-term requirements of the cultivator. Institutional credit of Commercial Banks, new Agricultural Credit Organisations and the Cooperative Movement have all got to be involved in the massive programme. The Cooperative Extension Officer of the Block helped by a Deputy Registrar of Cooperative Societies at the District Headquarters will be completely out of their depth in the new flood.

14. The existing pattern of administration is an attempt to streamline the administration to the previous approach to agricultural development. It is necessary to spell out the salient features of this approach to estimate the changes required. The approach to intensive cultivation has been emphasising :-

(a) Use of green manure, compost and fertilisers for better output;

(b) Distribution of improved seeds so as to saturate the area with improved seeds;

(c) Improving irrigation to ensure against vagaries of the season;

(d) Introduction of soil conservation practices so as to conserve moisture and improve utilisation of water; and

(e) Using improved agronomic practices, like Japanese Method of Paddy Cultivation.

The National Extension Service took up the duty of spreading this

gospel in the field. Each of these approaches was taken up as a separate programme. Targets were laid down for performance in each of these sectors. Yardsticks were fixed for each of these individual inputs. The field organisation of the F.E.S. was part of the Block personnel in the Community Development Blocks. Broadly, these consisted of 10 V.L.Ws per Block with the Agricultural Extension Officer as the Head of the Agricultural Division. This organisation was controlled by the B.D.O. and under Panchayati Raj came directly under the control of Panchayat Samiti. The District Agricultural Officer had the responsibility for giving technical guidance to the field staff. The Nalagarh Committee had recommended that the District Agricultural Officer must be given the help of Subject-Matter Specialists, like Agronomist, Entomologist, etc., to give the proper technical guidance to the field organisation. No State was in a position to support the General Programme with such Specialists.

15. With the cooperation of the Ford Foundation an Intensive Agricultural District Programme was started in 9 districts of the country and later expanded to 16 districts. In these districts, the programme was put under the control of a Senior Agricultural Officer, called the Project Officer, and he was aided by some Subject-Matter Specialists. The improvement they brought into the programme was to emphasise the package approach. This package approach was based on the full requirements of a good agricultural programme for the major crop of the area. A Farm Plan was prepared for each individual cultivator taking part in the programme and an attempt was made to guarantee the inputs for the programme. One important input emphasised in the programme was credit for the cultivator to invest in the inputs, like seeds, fertilisers, etc. for maximum return in the crop. The Cooperative Extension Officer was an important part of the programme. The Farm Management Specialist was a new innovation. He was to guide in the economics of the cultivation and to teach the

method of ensuring optimum return. A Soil-cum-Fertiliser Specialist was added to the Specialists Group to teach the utility of soil analysis and a correct dosage of fertiliser. An Engineer to help with machines was an innovation. A Water Management Specialist to teach the utility of correct water application was another innovation. The package approach, spread out to individual Farm Plans, required more Extension Workers in the field and more Specialisation in the higher expert level. The number of V.L.Ws was increased to 20 per block. A.E.Os were expanded from one in the N.E.S. to 4-5 in the I.A.D.P. Blocks. Some of the A.E.Os were generalists, whereas an attempt was made to get some specialisation in plant protection, fertiliser application, etc. The general line of A.E.Os were given some training to fit into the posts of Pest Control Specialist and Fertiliser and Compost A.E.O. The I.A.D.P. Programme was supported from the Centre by a large staff of Specialists and Extension Officers. An attempt was made to spread the I.A.D.P. message to a larger number of districts in the country through the I.A.A. programme. Whereas the programme was maintained more or less at the same pitch as for I.A.D.P. districts, the staff was diluted substantially. The I.A.A. block had only 15 V.L.Ws and 2 A.E.Os. The District Agricultural Officer was supported by 2 Specialists only, one for crop production and another for pest control. The Central Organisation for I.A.D.P. took charge of the I.A.A. Programme also, thereby diluting the coverage of Specialists for the Field Programme.

16. The Programme Administration for Agricultural Production has followed the requirements of the Production Programme so far. The N.E.S. came in office when the basic ideas of the new approach of proper inputs, like good seed, fertiliser and green manure, along with utilisation of the land properly had to be carried across to the whole nation. A thinly spread out Extension Organisation, which could put across the simple principles in the field, was sufficient for the programme. V.L.Ws with orientation in agriculture and Agricultural Extension Officers chosen out of the lower cadres of the

Agriculture Department were able to get the message across on the whole satisfactorily. As the pressures for more production developed, the package approach was evolved by the I.A.D.P. The same Extension Organisation was strengthened to deal with the individual cultivator. Some Specialists were introduced at the Block Level and the District Level. The Block Level Specialists were still chosen from the same lower cadres of the Agricultural Department of the State, but an attempt was made to give them some subject-matter orientation, like pest control, compost and fertiliser use and seed processing and treatment. The District Level Specialists tried to introduce new ideas, like pest control, farm management and the use of machinery. These programmes were in an experimental stage. The District Experts were fed by Experts at the Centre. Though the I.A.D.P. Experts could draw upon the State Experts, substantially the dependence was on the Central Experts. The Central Experts formed a group by themselves and had no link up either with the Main Agriculture Department or the I.C.A.R. which is the Central Organisation controlling research and disseminating research knowledge. As the pressures of the programme developed, it was found that much more intensive work in several fields and a stronger organisation at the District Level were necessary to support the programme. The Ford Foundation have, therefore, offered that 5 out of the 16 I.A.D.P. districts will be selected for the intensive work. The types of District Organisation that will be necessary to strengthen the programme is being studied. A strong Cell is being formed at the Centre to support the programme with subject-matter Specialists. The basic field staff still continues to be the V.L.W. and the A.E.O. drawn from the lower cadres of the Agriculture Department. If the District Level Specialists are to attend to all the intricate problems of their speciality in the field, it may be found very soon that they will not be able to cover the district fully.

programme. High level technical guidance is necessary in the specialised fields of seed production, pest control, soil analysis and prescription of fertiliser application, water management, introduction of machinery and supporting the programme with a maintenance organisation. Credit of short, medium and long-term nature to enable the cultivator to get his inputs is an important need. Demonstrations have to be of a high standard. Can the basic Extension Service of V.L.Ws and A.E.Os meet the needs of the situation ?

18. The present system of a generalist Extension Worker at the Village and Block Level with some orientation training in particular disciplines supported by Specialists at the District Level will not be able to manage the new programmes. In many of the disciplines, it is found that higher technical competence at levels lower than that of the district will be required. It also appears that a generalist with a little orientation in a specialised discipline will not be enough to tackle the technical and scientific problems that may arise in many disciplines. A Subject-Matter Specialist at lower levels than a district is a need of the programme. Parallel problems have been tackled in other sciences. We can draw upon our experience in medicine and health for a parallel. The general practitioner was for a long time sufficient to meet most of the requirements of the people. The objective was cure. When preventive medicine came into the field, a parallel line of experts in preventive medicine, called Health Authorities, were brought into the picture. As Medical Science improved, the general practitioner was given the support of Specialists for blood, urine, and similar specific examinations. As Medical Science developed, further specialised disciplines, like heart nervous system, ear, nose and throat, gynaecology and so on started having their own Specialists at the field level supported by their own system of specialised examinations. In the agricultural sector, we are now trying to jump the second and third stage of health in one jump. Preventive measures in plant protection and disease control has to be spread rapidly over the entire agricultural sector. Specialised disciplines, like seeds,

pest control, soil analysis, water control, machinery and credit have to be found their field level organisations. It is sometimes argued that coordination at Village and Block Level is important and this coordination can only be effected by training the V.L.W. and the Agricultural Extension Organiser in the new disciplines and giving them overall charge of their areas. Here again, we can draw a parallel from Health. The general practitioner has not been put out of business. He is still the first adviser, who, seeing the requirements of the situation, advises his patient to take to other specialised disciplines. The general practitioner supports the Health authorities with information about preventive requirements and epidemic control. There is no reason to believe that a parallel system of organisation in the agricultural sector will not answer the requirements of the situation.

19. The research worker has to be closely involved in the field programme in order to reduce the period of transition from ordinary agriculture to agriculture based on science and technology. The Scientist in this country has, so far, been working as an individualist. Rapid scientific advancement today is a corporative effort. The individualist has to merge his individuality in a programme for rapid break-throughs in science. The Indian Council of Agricultural Research has taken up the responsibility for coordinated research in the country. The coordinated fundamental research, when it throws up improvements, there is a need for rapid translation of the finding to the field. Large-scale field application has to be worked out rapidly, firstly on a trial basis and later as a demonstration. Recently, it has been accepted that all the Research Institutions in the country will involve themselves in the field in national trials of the facts established by research and national demonstrations of accepted truths. This way, science tries to approach from the top the field of operations. A meeting ground has to be found between the generalist field worker at the Block Level and the

that has been proposed is to have a corporation for promotion of fertiliser use which will later on take up pest control and soil analysis within its wings. This organisation is to have a medium level field of Specialists in their disciplines. This may be one way of bridging the gap. Another attempt is also being made to enable the research scientist in an Institution to take up a large area for coverage. The I.A.R.I. has accepted a programme of scientific demonstrations and advice in two districts of Uttar Pradesh, a district of the Punjab and the Delhi Administration. A parallel programme is being organised by the State of Madras through the Coimbatore Agricultural College and its Sub-Stations. This experiment may also throw up new methods of approach.

20. The Programme Administration to ensure the services for the new agriculture, based on science and technology, has to take note of the limitations of organisation. So long, the approach has been for the State through its Extension Organisation to try and find all the services necessary to the cultivator for his programmes. As the field spreads and the needs multiply, greater and greater involvement of the individual and his local organisations is a necessary approach. Formally, private enterprise tries to fill up the gap in requirements when a commercial approach to the problem is possible. In agriculture, so far, the question of services has always been linked up with subsidies. The subsidy approach inhibits growth of private enterprise in a healthy manner. Recently, there have been break-throughs in the thinking. As long as the programme provides economic return to the cultivator on fair prices for inputs, the cultivator is prepared to pay for his services. We have to make use of this new orientation in the thinking of the average cultivator. Custom services will have to be built up. The Programme Administration will have to plan gradually to get out of detailed services into planning for services.

21. The requirements of personnel and the qualifications for the same have been spelt out broadly in the above paragraphs. The field staff is required of the specialised variety, in addition to the generalist we have used so far. The requirement will be large in numbers as the programme advances. The supervision of the programme also requires Specialists in various disciplines, in addition to the generalist we have used so far. During the Third Plan, the basic preparation of Experts in the field of pest control, soil analysis and so on has started in our Universities and Colleges. The programme has to be stepped up. Field orientation of these Experts and in-service training for selected Specialists in the field in the new programme is a new demand and has to be organised. Meanwhile, the in-service training organised during the Third Plan for V.L.Ws and A.E.Os requires full attention in order to bring rapidly in the field the message of science and technology. These generalists have to absorb a new approach to their work. The involvement of the individual and the private sector, whether cooperatives or otherwise in the programme of servicing the agriculturist, requires continuous and regular emphasis. The Extension Worker must be made aware of this need and has to learn the methods of achieving the objective. The research worker has to get down to the field. The Agricultural Universities have, in the Third Plan, started on the pattern of the Land Grant Universities of America, the training and approach in their curricula. The pace has to be regulated to the needs of the situation. Many of these ideas are not new. In some form or other, we have taken note of the requirements of a scientific approach to agriculture. What is now wanted is system towards a target.

22. We have now discussed the needs of the new programme. The administration for this programme requires mobilisation of Experts in various lines of agricultural development and coordination of the work of these Experts. It requires the close coordination of the Research and the Extension Wings of the Agricultural Service. It

in the servicing of the programme. Certain targets of coverage will have to be achieved, if we are to grow in the country the agricultural produce necessary for our economy. We now come back to the beginning of this article. Have we the means to satisfy this end ? If today, we have not got the means, can we build up the means year after year in the Fourth Plan to keep pace with the phased requirements of the economy. The question is now put.

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For Participants Only

AA II/3

SEMINAR ON

AGRICULTURAL ADMINISTRATION

(March 9th-12th, 1966)

IMPROVED SEEDS PROGRAMME

(1951-1965)

By

J. Veeraraghavan,
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I. REVIEW OF PROGRESS 1930-65

1. Agricultural productivity can be significantly increased by the use of improved seeds. The striking benefits that accrue from new improved varieties which are high yielding, fertilizer responsive or disease-resistant are obvious. Equally important, are the benefits from the use of genetically pure and physically healthy seeds of existing varieties - seeds which have a high germination percentage and are free from weeds and mixtures. Such seeds ensure a uniform and good stand of crop and prevent or reduce seed-borne diseases. Farmers appreciate these facts and are very receptive to the use of good seeds. They will incur considerable expense and trouble to secure good seeds of the latest and best varieties.

2. The importance of an improved seeds programme was pointed out by the Royal Commission on Agriculture (1928) which recommended greater scientific research in plant breeding and adequate arrangements for seed multiplication and distribution. The establishment of research stations by the Government of India and the provincial administrations and the promotion and co-ordination of research by the Indian Council of Agricultural Research and Commodity Committees resulted in the evolution of many new varieties, particularly in cash crops like sugar cane, cotton and jute and in also in paddy and wheat. But progress in seed multiplication and distribution was not fully satisfactory and the Famine Enquiry Commission of 1945 and the Grow More Food Enquiry Committee of 1952 found that much remained to be done. The latter Committee made many detailed recommendations for the spread of improved seeds.

3. A study made in 1961 by the Programme Evaluation Organization of the Planning Commission indicated that between 1939 and 1950 the coverage under improved seeds increased as under:

Paddy : 6 per cent to 11 per cent of the area under the crop

Wheat : 22 per cent to 31 per cent of the area under the crop

Jowar : 10 per cent to 28 per cent of the area under the crop

The study, however, warned that these figures did not establish any specific trend of progress as they were neither reliable nor comparable.

4. During the First Five Year Plan the work of seed distribution which had begun earlier under the Grow More Food Compaign was continued. A sum of Rs. 2.2 crores was expended as grants and subsidies during the plan period for procurement and distribution of improved seeds. The Plan envisaged that the use of improved seeds would contribute 0.56 tonnes or 7.75 per cent of the total increase in production of food grains to be reached by the end of the Plan (6.5 million tonnes). The actual coverage under improved seed by 1955-56 is however, estimated only at 4.7 million acres with an additional production of 0.31 million tonnes.

5. Although the First Plan referred to the need for setting up a seed farm in each Community Development Block, this idea was given a concrete shape only in the Second Plan. The Second Plan envisaged the setting up of "a seed farm and a seed store at every National Extension Service Block". These were to be supervised by the Department of Agriculture and were to supply adequate quantities of foundation seed. Each National Extension Service Block was to be self-sufficient in meeting its seed requirements. The foundation seed from the seed farms was to be multiplied in the villages by registered growers and distributed to the farmers through institutional agencies like the Co-operatives. The foundation seed farms were pivotal to the entire programme and out of the total plan outlay of Rs. 18 crores for seeds, Rs. 16.7 crores or 93 per cent was earmarked for the setting up of these farms. A target of 3,000 seed farms with a total area of 93,000 acres was fixed. Later the target was increased to 4,328 farms with an area of 8,08,200 acres.

6. At the end of the Second Plan 1893 farms with a total area of 82,355 acres are reported to have been established. Most of these farms were established in the later part of the Plan. The Plan outline

had originally envisaged additional food grain production of 10 million tonnes by the last year of the Second Plan and of this improved seeds was to contribute 10 per cent or one million tonnes. At the end of the Second Plan 55 million acres of foodgrains were estimated to have been covered with improved seeds and the additional yields from this were estimated to be 1.23 million tonnes. About 20 per cent of the area under foodgrains was covered. The coverage of improved seeds for cash crops was much higher: Cotton 77 per cent, Sugarcane 97 per cent and Jute 53 per cent.

7. A Committee set up by the Indian Council of Agricultural Research at the beginning of the Second Plan had drawn up a detailed scheme for the multiplication of seeds, to ensure the maintenance of quality and sufficiency of seeds at all stages from the nucleus seed stage to the final stage of use by farmers. Although this Committee had drawn up a detailed model scheme for the guidance of State Governments the implementation of the seeds programme left much to be desired. The study of the programme Evaluation Organization (to which reference has been made already) and another study by the Committee on Plan Projects as well as administrative review by the Ministry of Agriculture brought out a number of deficiencies in the seed programme. Also the construction of seed stores - of which one was to be established at each seed farm - did not keep pace with the establishment of the farms.

8. These deficiencies in the Second Plan were sought to be remedied in the Third Plan. The Programme Evaluation Organization and the Committee on Plan Projects had drawn attention to the complaints about the quality of the seed. The setting up of seed Testing Laboratories was accordingly given high priority in the Third Plan programme. The target for foundation seed farms and the area to be covered was fixed at 4,789 and 1,19,225 acres respectively. As against this 2,349 farms with an area of 1,04,604 acres are reported to have been established,

Of this 2,100 farms were provided with seed stores. The balance of 249 seed stores at seed farms as yet not provided with them and 6,200 additional seed stores at distribution points with a 100 tonne capacity each are proposed to be set up during the Fourth Plan.

8.1 It was envisaged that at the end of Third Plan 203 million acres of foodgrains should be brought under improved seeds. As against this actual achievement is reported to be of 164 million acres in 1965-66. The mid-term plan appraisal in 1962-63 gave a figure of 81 million acres for 1962-63.

9. The Third Plan also saw the beginnings of a seed certification programme. The National Seeds Corporation was established in 1963 to produce foundation seeds of hybrid maize and other hybrids and to promote a sound seed industry. As part of its promotional service the National Seeds Corporation has taken up certification of hybrid seeds and vegetable seeds.

10. To sum up; in the 30 years ending 1960, there was much progress in research and in release of new varieties, but little progress in multiplication of good seeds thereof. During the Grow More Food Campaign and the First Five Year Plan, seeds were purchased from the market and distributed and such seeds were hardly different from grains.

The Second Five Year Plan envisaged a bold bid to make each National Extension Block self-sufficient in seeds, but in effect the seed programme was transmuted into a farm development programme.

The Third Five Year Plan was mostly pre-occupied with remedying the defects in seed programmes of the 2nd Plan. However, a beginning was made in seed certification on a voluntary basis and seed testing laboratories were established. Towards the close of the Third Plan promising new varieties were introduced and hybrids of jowar and bajra were released. The Fourth Plan offers a promise of a massive quality seed programme with emphasis on certified seeds of high yielding varieties.

II. PLANNING PRODUCTION OF SEED

11. The programme of seed multiplication in the Second and Third Five Year Plans was evolved from the detailed recommendations of the Grow More Food Enquiry Committee and envisaged:

(a) Self sufficiency in production and multiplication at each level

(b) A definite plan for saturation of crop areas with improved seeds and their periodic replacement from the lowest to the highest levels.

(c) The sole responsibility of the Government in the matter of production of nucleus, breeders' stock and foundation seeds and of supervision of multiplication of improved seeds.

12. The details of the seed production programme were formulated in concrete terms by a Committee set up by the Indian Council of Agricultural Research in 1958. The salient features of the programme as drawn up by the Committee were as under:

(a) Each development block should constitute a self sufficient unit for the production and distribution of improved seed and the entire area within the block should be brought under improved seed in a period of five years. There should be a Government Seed Multiplication Farm in each block and registered growers in each village.

(b) The seed produced at each stage of multiplication should be adequate for the succeeding stage and backward movement of seed from any secondary stage must not be permitted.

(c) Farmer's Co-operative Societies should play an important role as producers and distributors of improved seed in each block.

(d) The varieties selected for multiplication should be as few as possible and only such varieties which are likely to cover large areas and whose superiority over local varieties in respect of yield, quality and resistance to diseases and pests and other adverse conditions has been fully established should be selected for multiplication.

(e) To maintain purity of varieties the nucleus seed should be produced under direct supervision of the crop botanist. It should be multiplied on Government farms in one or two stages, so that enough pure seed, breeders' stock seed is produced to meet the requirements of each of the block seed farms. To maintain the purity of the foundation seed produced on the block seed farm, breeders' stock seed should be obtained afresh every year.

(f) The foundation seed produced onthe block seed farm should be further multiplied through the agency of registered growers. The Gram Sevaks and extension workers should be trained by the crop botanists in the technique of production of pure seed, including identification of varieties, roguing etc.

13. A definite plan for saturation of the cropped area with improved varieties, worked out in detail, phased over the years and indicating the quantities of nucleus, breeders', foundation and certified producers' seed to be produced year by year of each variety is the pre-requisite of success in a seed programme. The State Governments' accepted this approach but could not obviously stick to the concept of covering the "entire area" within five years. This was impossible for the simple reason that improved varieties were not available for some areas and for some crops. The State Governments and agencies responsible for implementing the programme in the field had also to take into account practical limitations. While all State Governments accepted the concept of planning for seed saturation, their choice of crops, targets and pace of coverage differed widely.

14. A team set up by the Committee on Plan Projects which reported in 1961 referred to the varying approaches in the States on the question of seed planning. The team observes:

"In Mysore the period (of saturation) was taken as four years, in Maharashtra five and in Madras three for rice and millets. In some other States, the target for saturation was 10 years and in still others no target was prescribed. In most States the plan as drawn up was only for the most important cereals and millets such as rice, wheat, bajra and jowar. Generally small millets and pulses were not included in the plan".

14.1 Despite these variations, it may be noted that all States had a definite plan of seed saturation.

15. The objective of drawing up a seed saturation plan in advance is to ensure that (a) the farmer is enabled to obtain in time improved seed of the variety he wants, (b) the registered seed growers are able

to obtain the required foundation seeds in time and (c) the foundation seed farms are able to get the nucleus seeds of the required varieties in time. It should be ensured also that at each stage the seed would be of the highest quality.

16. The earlier Programme Evaluation Organization study and some instances cited by a more recent study on problems of co-ordination in agricultural programmes suggest that seed supplies were inadequate in quantity and sometimes unsatisfactory in quality and occasionally were not received in time for sowing. The COPP team, on the other hand, found that the deficiency was mostly at the last stage of supply of certified seed to the farmers. The team considered that the supply position of improved seed from the nucleus stage was more or less adequate for rice, irrigated wheat, jowar, bajra, ragi and cotton. Nucleus seed was inadequate for barani wheat, gram, barley, pulses, small millets, groundnut and other oil seeds. Foundation seed was adequate for cotton and met 90 per cent of the requirements for jowar. It was adequate only for 55 per cent of ragi, 12 to 14 per cent for gram and barley and less than 5 per cent for other crops. The distribution of seed at certified seed level was considered inadequate for all crops except cotton. Both the Programme Evaluation Organization study and the COPP study were made in 1961. Most of the foundation seed farms were just getting established. The yields from the seed farms were low. The situation has considerably improved since 1961; it is doubtful whether the shortcomings in seed supplies have been entirely overcome in terms of quality or quantity.

17. Nevertheless the acceptance of the concept of advance planning for seed saturation meant a great step forward. Sometimes the planning might go wrong, sometimes the execution might be inadequate, but it is only through advance planning adequate seed supplies could be ensured. The salient aspects of planning may be recapitulated here:

1) Selecting the improved varieties to be propagated
2) Determining the period of seed renewal
3) Determining the seed rate to be used by farmers
4) Determining the seed yield per acre that can be obtained at the foundation, nucleus or seed states/certified producers'.

18. Any error in the premises or in calculation at any of these stages would adversely affect the programme of seed coverage. However efficient the execution of the plan, a mistake at the planning stage is serious as it cannot be corrected later. The selection of varieties presents the most intriguing of the problems at the planning stage. The extension officers and those who are in close touch with extension tend to rely excessively on the farmers' preferences for varieties. Yet extension has to provide leadership and introduce and popularise outstanding new varieties even though the farmer may show an initial reluctance to adopt them.

19. The States have adopted different periods, 3, 4 or 5 years for seed renewal. For hybrids, seed has to be renewed each year. For varieties (other than hybrids,) a certain deterioration occurs at each successive crop. The period of seed renewal depends on the rate of deterioration. The period of seed renewal should be laid down for each variety after thorough scientific study. In the meantime the following periods assumed by the Working Group on Fourth Plan could be used for planning the seed programme:

Paddy	..	Once in four years
Wheat	..	Once in five years
Jowar	..	Once in three years
Bajra	..	Once a year
Ragi	..	Once in five years
Gram	..	Once in five years
Barley	..	Once in five years
Tur	..	Once in three years
Groundnut	..	Once in five years
Cotton	..	Once in five years
Jute	..	Once in five years

20. It is undoubtedly true that farmers use excessive seed rates and this has to be brought down. But seed rates vary widely from place to place and depends on whether a crop is grown under irrigated or unirrigated conditions and whether it is broadcast, dibbled or transplanted

At the planning stage the seed rate must be assumed realistically and the error if any should be on the side of over-estimating rather than under-estimating. If surplus seed is produced it could be carried over and sold in the next season. Seed yields per acre should be assumed realistically and must allow for losses due to roguing, sorting and processing at all stages and especially at the nucleus, breeder or foundation seed stages. If the varieties are well selected, the seed rate for sowing and seed yields per acre are realistically estimated and the seed renewal period is scientifically established, proper planning of seed production targets at various levels becomes merely a matter of arithmetic.

20-a. Certain suggestions for improvement of seed planning may now be considered.

20-b. The breeder and foundation seeds have to be planned and produced two to three seasons in advance of the season in which the farmer needs the seeds for sowing. Seed planning must, therefore, be forward looking and take account of the changes and trends in agriculture. For example, the increasing availability of water and fertilisers and the likely release or introduction of new hybrids or other high yielding varieties must be taken into account at the time of planning for seed saturation.

20-c. A <u>reserve stock</u> of breeder and foundation seed should be maintained. There is always the likelihood of sudden crop failures, unexpected increase in demand for a variety. Carrying such reserve stocks on an adequate scale is expensive. Breeder and foundation stocks are costly to produce and costly to maintain. There is always the risk of deterioration in storage and the further risk of obsolecense arising either from change in crop-patterns or from release of superior varieties. Such losses are a necessary part of a dynamic seed programme and failure to recognise this would lead to a timid programme and loss of potential increases in agricultural productivity.

20-d. Facilities at research institutes are inadequate for sufficient breeder stock seed production. Merely because seed is produced at a research station, it does not become "breeder stock seed". While building up the facilities, care must be taken to plan for large quantities of breeder stock seed. Where a new variety is released the quantity of nucleus and breeder seed available is a serious limitation in further multiplication and, therefore, in the pace of the spread of variety. The following quotation from "Cereal Breeding Procedures" (FAO) is relevant in this context:

> "When the results of breeding programme may immediately save the farmers from the ravages of a certain insect, disease or weather situation, the original sample for the nucleus need not be restricted to 200 plants but can be much larger. For example, when stem rust of _ was causing great loss on the northern plains of North America and the variety Thatcher was produced and tested in the United States, it was obvious that this variety should be increased on a pure basis as quickly as possible. Not 200 but 4,000 heads of Thatcher were taken and the seed sown in individual head rows in a very large nucleus. Increase from this large start was rapid and in a few years pure seed of Thatcher was being sown on several million hectares". /wheat

The only way to ensure an adequate stock of breeder seed is to entrust this responsibility to the National Seeds Corporation and State Seeds Corporation which should be asked to plan and ensure adequate production, maintain stocks and provide requisite facilities to Research Institutes.

20-e. Apart from building adequate stocks of breeder stock and foundation seeds, every possible step must be taken to hasten the release of new varieties and to speed up the pace of their spread. In a country trying to make up for lost time, time is the most important resource and any delay in release or spread of a new promising variety would be costly. The recent constitution of <u>Central and State Variety Release Committees</u> offers promise of clarity and progress in respect of recommended varieties. These Committees would screen scientific data relating to varieties and recommend those considered suitable and withdraw those considered obsolescent. The speed and efficiency with which new varieties are introduced and old varieties are withdrawn will have a great impact on agricultural productivity.

III. IMPLEMENTATION OF PRODUCTION PROGRAMMES

21. The programme of seed production adopted in the last two plans envisages:

(a) the production of nucleus and breeders' seeds in Government research farms,

(b) the multiplication of above seed into foundation seeds at Government seed farms established in the blocks, and

(c) the further multiplication of foundation seed into approved producers' seeds by selected farmers.

21.1 Thus, Government undertook the responsibility to produce all the nucleus and foundation seed needed on its own farms. The model scheme drawn up by the Indian Council of Agricultural Research envisaged the establishment of a farm of 25 acres in each National Extension Block for foundation seed production. The object of decentralising foundation seed production was to cut down transport costs, to make the block self-sufficient and to involve the block staff actively in seed production. Quality of seed production was sought to be ensured by keeping the foundation seed production wholly under the control of the Department of Agriculture.

21.2 But soon after the commencement of the Second Five Year Plan the policy of establishing farms of 25 acres size had to be reviewed. In Kerala farms of about 8 acres were considered practicable while other States established farms of 50 acres or 100 acres. The team set up COPP considered a farm of 50 acres of irrigated land or 100 acres of unirrigated land as the minimum viable unit. This meant that the foundation seed firms were to serve more than one block. To overcome transport difficulties seed stores were to be set up in each block.

21.3 Difficulties were also experienced in obtaining suitable land for setting up the farms. In many States the seed farms were established on waste/or forest lands. In other States the farms were set up on leased lands where no permanent improvements were possible. In Punjab Government seed farms were leased to private farmers for operation and

production of foundation seed - a practice which has proved to be undesirable and was given up.

21.4 A large majority of the farms incurred losses. The yields obtained from the farms were very low. The quality of seed produced left much to be desired. The farms were under the administration of the State Departments of Agriculture. In 1960-61 only 32 per cent of the officers in charge of the farms were agricultural graduates.

21.5 The farms were to be supervised by the crop specialists of the State for ensuring the purity of the foundation seed, but there was hardly any systematic inspection. The number of crop specialists in each State was not adequate to take care of the inspection work in addition to their other duties. Further the policy of decentralising the foundation seed production in small farms of 25 acres made adequate inspection difficult, time consuming and expensive.

21.6 The foundation seed farms were expected to receive breeders' seed each year from research stations, but often they failed to receive required quantities of breeders' seed, also there was lack of co-ordination between the block staff and the block seed farm staff resulting in the multiplication of varieties in the farms other than the varieties preferred by the farmers.

21.7 Hardly any farm was equipped with seed processing, cleaning and testing equipment.

21.8 Some of the difficulties faced by the seed farms were undoubtedly in the nature of teething troubles. This is evidenced by the fact that since 1961 the performance of many seed farms has improved both in respect of yields per acre and in regard to profits. Still the performance of a large number of farms remains unsatisfactory. The Fourth Plan Working Group which examined the question has suggested the screening of all the existing farms and provision of additional facilities to all potentially good farms and the diversion of unsuitable farms to other uses. The working group has also recommended the provision of seed processing equipment to all good seed farms.

21.9 There are about 2,349 farms with a total area of one lakh acres under foundation seed farms. With the adoption of the measures recommended by the Working Group, it should be possible to bring these one lakh acres to peak efficiency. These farms are adequate for production of all the foundation seed needed. It would still be a debatable point whether the production of foundation seed essentially depends on the thoroughness of various operations, observance of required precautions and frequent checking and counter-checking by responsible and technically competent and experienced officers. The management of a foundation seed farm often calls for courageous and forthright decisions on the spot to remove off-types, to destroy plots which are badly contaminated and are a source of contamination for other seed plots etc. Inspections by outside experts like crop specialists of States and personnel from research institutions must ensure the observance of required precautions. All havesting, cleaning and bagging must be done in the presence of a responsible officer who should seal every bag and affix the name of the variety. From all these aspects it would certainly seem preferrable to concentrate on foundation seed production on a few select large farms conveniently situated so as to facilitate frequent outside inspection. If large farms cannot be acquired or leased, there should be no objection to contracting with progressive farmers in areas continuous to the selected farms so long as such farmers agree to inspection and roguing and to hand over to the Department all the foundation seed produced. Such large foundation seed production areas could be economically serviced by a processing plant. No doubt the movement of foundation seed from the centralised farms to every block will involve additional time and transport costs. But the benefits from good quality foundation seed permeate through approved producers' seeds to so many lakhs of acres, that any added cost of transport etc. must be considered well worth incurring. In fact quality in seed must come first and cost considerations

This applies to foundation and approved producers' seed as well. The Fourth Plan Working Group has not, however, recommended any change in the present set up of foundation seed production.

21.10 The foundation seed produced on the block seed farms is further multiplied into approved producers' seed through the agency of progressive farmers. Depending upon the nature of the crop and quantity of seed, required, there may be more than one class of growers - popularly known 'A' class, 'B' class and 'C' class registered growers. The Experts Committee set up by the Indian Council of Agricultural Research in the beginning of the Second Plan had made a number of recommendations in regard to the system of multiplication of producers' seed through farmers. These were:

a) Foundation seeds should be supplied to the 'A' class grower each year from the block farm

b) It would be desirable for each registered grower to grow only one variety on his holding

c) The registered grower should so plan his crop that it is at a safe distance from similar crops on neighbouring farmers' fields to leave out a border of about 5 feet around the plot.

d) The multiplication of seed through A, B and C class growers in a block should be done under the supervision of the block development officer and his staff. The Gram Sevak should arrange, in particular, to have the roguing of the A and B class registered growers done under the strict supervision of Agricultural Extension Officer.

e) The Agricultural Extension Officer should issue a certificate of purity of the crop and whether it is fit to be procured.

A system of multiplication through the registered growers was adopted by almost all the States through the registered growers were known under different names at different places. The quality of seed produced by the registered growers does not, however, seem to have been quite satisfactory. Part of the reason is, no doubt, inadequate guidance and inspection work. The Programme Evaluation Organization study of 1961 found that 73 per cent of registered growers had done weeding on their own crops, 30 per cent had taken plant protection measures, 50 per cent had done roguing and 82 per cent had done

separate threshing and storing of seed. Though all registered growers are required to take precautions for maintaining the purity of seed, 7 per cent were not aware of any such requirements. About 61 per cent stated that the village level workers or the agricultural extension officers had done supervision of their fields. But only 10 per cent said that seed samples of their produce were officially tested. Though 61 per cent had stated that the village level workers or the agricultural extension officers supervised one or the other of the agricultural operations, only 6 per cent of these who had followed these operations reported inspection having been done of weeding operations, 26 per cent of plant protection measures, 34 per cent of roguing operations, 19 per cent threshing operations and 14 per cent storing operations.

21.11 It appears that neither the village level workers nor the agricultural extension officers who are supposed to inspect the registered seed growers are equipped for the job or have the time for it. Seed crop inspection is a specialised technique and a wholetime job. Until trained agricultural graduates are employed to inspect the seed crops periodically as a full time job and made to take the responsibility squarely for the purity of the crop, inspection and certification will remain perfunctory. The Fourth Plan Working Group has recognised these difficulties and has suggested that instead of spreading the registered growers one for each village, the registered growers should now be concentrated in blocks of 8,000 acres around selected foundation seed farm. A senior experienced officer who will be incharge of such selected foundation seed farms will also have the responsibility for directing and guiding the certification of the seed crop on the 8,000 acres surrounding the seed farm. He will be assisted by 6 Kamdars who will be exclusively engaged in the inspection and certification of the seed crop. If the Kamdars are thoroughly trained and if the officer

to be much superior to the present scattered system of registered seed production. It would, however, appear that the working group has underestimated the number and calibre of workers needed to ensure purity in the seed crop.

21.12 The organisation of a sound field inspection and certification service is the first condition of success in seed programme. No less important is the selection of seed growers. While any farmer can grow a grain crop, a good seed crop can and should be grown only by the most progressive farmers. The farmers who adopt the best cultural practices and are prepared for the risks associated with the seed programme should be chosen. Integrity is of utmost importance. Seed growers should not be changed frequently, so that the advantages of specialisation may be realised. Having selected the right type of growers, every facility like water, fertilizer, pesticide, etc., should be provided to ensure maximum multiplication of seeds. While an attractive price must be offered to the seed grower, it is necessary to ensure that the price is not so attractive as to draw unscrupulous farmers. Similarly the provision of fertilisers etc., should be restricted to seed growers of proven ability and experience and should not be used as inducements to draw farmers into seed production.

21.13 The possible specialisation of certain areas for seed production needs to be explored vigorously. Certain areas are better suited than other areas for seed production. Dry areas with irrigation facilities are preferred, as such areas are relatively free from diseases. There is need for an immediate survey of areas specially suited for seed production of different crops.

IV. SEED DISTRIBUTION

22. Under existing arrangements a farmer could obtain his requirements of improved seeds from the following institutional agencies:

(a) Stores or depots of agricultural department of State Govts.
(b) Co-operative societies
(c) Panchayats
(d) Block office/VLW
(e) Registered growers

22.1 He may, of course, obtain seed from his own farm or by exchange with other farmers or from certain private seed merchants in some cases. But the quality of some of the seeds would be doubtful. Here we are concerned with the distribution of registered seed produced in accordance with the seed multiplication plans of the Government.

23. Seed from the sources mentioned above may be received on loan or barter or against cash payment. The present arrangements for distribution of seed may be classified into three groups which sometimes exist in combination in most States.

24. First there is a group of States which have sought to leave the distribution to the registered growers without entering into any arrangements with them regarding procurement, storage and transportation of seeds. Madras, Mysore and West Bengal fall in this group. In these States the Agricultural Departments and the block stores are also reported to be distributing seed to the ultimate growers. This is said to be only a transitional feature which would effect a balanced distribution from registered growers under the general supervision of the block administration and the village level workers.

25. The second pattern of distribution is organized largely around the cooperative society. The co-operatives are entrusted with the work of purchasing or procuring seed from the growers and distributing it to the mass of cultivators. Maharashtra, Gujarat, Bihar, Orissa and Uttar Pradesh rely very largely on this system. Whereas in Gujarat and Maharashtra the seed produced by registered growers is expected to be purchased by the co-operative societies, in Uttar Pradesh the co-operative stores supplies seed on loan (Sawai) and the cultivators return the same with 25 per cent interest which is again supplied to the mass of cultivators in the next sowing season. In Rajasthan the Apex Co-operative Marketing Society is responsible for procurement of seed while distribution is entrusted to Panchayat Samitis. But some

26. The third system may be said to be direct distribution by Government. The seed is procured by the Agricultural Department and distributed through its own depots, block depots or village level workers. This system operates in Andhra Pradesh, Madhya Pradesh, Punjab, Assam and Kerala.

27. Distribution through co-operative societies has great advantages as the seed can be given to the members of the Society on credit. Besides, along with the seeds other inputs can also be supplied. The co-operative societies, however, have not found the handling of seed a profitable venture. On the other hand they find it to be risky as sometimes seed of a variety might remain unsold resulting in loss to the co-operatives. Further as against other profitable lines like fertilizers, the business in seed is not attractive. It is necessary to interest the co-operatives in the marketing of the seeds by providing an adequate margin of profit to them. It appears, however, that under present conditions seed should not be distributed on consignment basis through the co-operatives as sufficient care may not then be taken either to sell the seed or to return it or even to store it properly.

28. To ensure proper distribution there should be adequate sales points and storage facilities. The Fourth Plan Working Group has recommended the construction of about 6,000 seed stores each capable of holding 100 tonnes. The construction of these stores should be expedited. This would be in addition to the 3,000 stores located in the seed farms. Distribution through registered growers has good scope provided the registered gorwers could develop and adopt sound business techniques leading to a profitable business. If the registered growers are allowed to fix their own prices for selling the seed and if they maintain high quality of seed, it should be possible for them to build a profitable business of distribution of seed. They will in such cases be able to develop a good market and this will further give them the incentive for constant improvement in quality. The

Departments of Agriculture may, however, be averse to permit registered growers the freedom to fix prices, as this will imply incidentally the freedom to cut down production, fix targets etc.

29. The present position regarding distribution of seeds remains unsatisfactory and therefore farmers continue to depend mainly on their own produce or on exchange with other farmers. It is, therefore, necessary to pay greater attention to this problem and to devise a proper arrangement. One cannot be dogmatic about the superiority of one system of distribution over another. In view of the importance of providing adequate seed to farmers several agencies have to be utilised. Distribution through multiple agencies competing with each other on a fair basis would be in the interest of the farmer. The basic precondition of the seeds should be done by all agencies on strictly commercial principles. This means that there should be no hidden subsidy in the distribution of seeds as will be the case when the block or Government agencies are utilised. Subsidies for distribution of seeds may still be necessary so that seed distribution in remote and difficult areas is encouraged and the expenses of maintaining stores at distant places is met without undue burden on the farmers. But such subsidy should be available equally to all agencies distributing the seed whether they are registered growers, seed companies, private seed merchants, Panchayats or co-operatives so long as all the seed distributing agencies agree to sell only certified seed.

30. An important aspect of seed distribution which has not received due attention is that seed should be distributed only in sealed bags. Sale of seed in open bags leads to possibilities of adulteration. Along with the bag of seed a package of practices for the particular variety should be given to the farmer. A copy of this package must be kep inside the seed packet so that it is readily available at the time of sowing and extension agencies should ensure proper cultivation of the

varieties distributed. There should be a systematic arrangement for investigating any complaint on the quality of the seed and for bringing the matter to the notice of the authorities responsible for such quality. The seed stocks held in stores or with farmers should be periodically sampled and tested at Seed Testing Laboratories to check their viability.

31. By far, the best means of providing an adequate distribution system of seeds is the development of a seed enterprise in the truest sense of the term. This means that there should be a large number of seed merchants and seed companies working under competition and marketing certified seeds. Some of the seed companies may be in the public sector, but the nature of seed enterprise is such that a number of medium or small-sized businesses operated by private enterprise can more effectively serve the farmers in their respective areas. The most important obstacle to the development of a sound seed enterprise is the absence of a seed law to safeguard the interests of farmers against unscrupulous seed merchants. If Seed Bill (now before Parliament) is passed this deficiency will be removed.

32. A seed enterprise will not develop unless restrictions on prices and movement of seeds are removed. In a country where the importance of the marketing function is generally ignored, cries of "profiteering" are likely to emerge as soon as a seed merchant tries to provide a return for himself after covering his costs and risks. As the volume of turnover in seeds will be small, a good margin must be earned by the seed producer and wholesale and retail dealers to make the business in seeds worth their while. The seed business is a business in quality products and quality products have to be high-priced. Seed is different from grain, as steel from iron are and to ask that seed should be sold at the cost of grain or with a slight premium over the cost of grain, is to ensure that grain is sold in the name of seeds.

33. A major difficulty faced by seed companies is in retail distribution. Unless there are good dealers covering the villages, marketing of seeds direct to farmers instead of through Government agencies, will

remain a dream. Some of the more efficient co-operatives, fertiliser distributing agencies, agricultural supply companies and the Food Corporation of India, could be utilised for retail distribution. Gradually some progressive farmers could be encouraged to set up as dealers in their respective villages. But covering the entire country through dealers will remain a distant goal for some years to come. The vast distances, transport bottlenecks, poor communications, general economic backwardness, the low unit of sale per farmer, his inability to pay in cash, all militate against a speedy development of retail distribution through a system of dealers appointed by seed companies and seed corporations. We have, therefore, to rely at least for the next decade on distribution through the Department of Agriculture and other official or quasi-official agencies. At the same time, it must be ensured that such distribution does not come in the way of the development of a system of commercial dealers.

34. The non-availability of short-term finance is a major constraint in the development of seed enterprise. The fixed assets of a seed company are limited and methods of borrowing against "profit potentials" are unknown. Loans can be obtained no doubt for a shortwhile against the pledge of stocks of seeds. This can cover the period from purchase of seeds and their processing and packing till the time of despatch. But the seed producer has to find the money to redeem the pledge when the seed despatch work commences. Most of the sales for sometime to come, would be to Government departments and if the departments could be prevailed upon to make advance payments or at least cash payments on delivery, this might alleviate the problem. But it is doubtful if bank finance would be available in time and in adequate measure for developing this industry which is new to India. An Agricultural Development Bank might be a more appropriate institution for helping the establishment of a seed industry. The existing financial corpora-

cannot hope to get its share from these institutions. The National Seeds Corporation has been established as a promotional agency for the seeds industry. It could be authorised to take up the functions of a development bank in regard to this particular industry with the collaboration of one of the leading financial Corporations of Government.

V. ROLE OF VARIOUS AGENCIES

35. There are currently a multiplicity of agencies in the field of seed production and distribution. Mention may be made of

1) The National Seeds Corporation
2) The State Seeds Corporation
3) The Department of Agriculture (Government of India)
4) The Indian Council of Agricultural Research
5) The Research Institutes thereunder
6) The State Departments of Agriculture
7) The Research Institutes under the States
8) The established seed merchants mostly operating in vegetable seeds
9) New seed producers in hybrid seeds
10) The block level seed farms and other state farms
11) Agricultural Universities and colleges which have farms attached to them
12) Progressive farmers who multiply seed for Government and other agencies
13) Marketing and processing co-operatives.

36. The multiplicity of agencies in the field would be to great advantage if their programmes are well co-ordinated. Either the Department of the Ministry of Agriculture or the National Seeds Corporation should take up this co-ordinating function and assign different specific tasks and targets to different agencies. They should keep in touch with the progress made by the various agencies and ensure that deficiency or short-fall by one agency is made up with the help of other agencies.

37. The National Seeds Corporation should be entrusted with the overall responsibility of ensuring adequate supplies of breeder and foundation seed of all varieties of inter-State or all-India importance. The State Seed Corporations should have similar responsibilities for seeds of varieties with in the State. In the discharge of its

responsibilities, the National Seeds Corporation has to work with and through the State Seed Corporations. The National Seeds Corporation should build up State Seed Corporations and provide overall guidance and also participate in the equity of State Seed Corporation.

38. The National Seeds Corporation and the State Seed Corporations, acting together, could foster a private seed industry producing and marketing certified seeds under strict quality control. The private seed industry should be assisted to develop a sound marketing systems and pending the development of such marketing, the distribution of seeds through the Department of Agriculture should be continued. The National Seeds Corporation should serve as a pioneer in the introduction and promotion of new varieties and provide certification services, establish training facilities, undertake and promote research on seed processing and packing and provide technical guidance to seed companies and seed corporations.

39. While a private seed industry should be fostered to meet the needs of farmers, it has to be recognised that for the next decade, the pace of development of private seed industry might be inadequate to meet the requirements of agricultural development. The National Seeds Corporation and the State Seed Corporations should, therefore, each undertake to produce atleast 25% of the requirement of the country, the remaining 50% of the requirement being met by the private seed industry. Production and marketing of certified seeds by the National and State Seed Corporations should be kept distinct from promotional work of the Corporations preferably carried through organisation of subsidiary companies. The commercial wings or subsidiaries of the Corporation should function on commercial principles and compete on equal terms with private seed industry.

40. The National and State Seed Corporations should be autonomous in their working. Similar autonomy cannot be given in respect of their targets and programmes, as seed is a matter of importance to the

Central and State Seed Corporations have to be in line with the policies of the Government. Hence, it would seem to be inappropriate to have these corporations under the Companies' Act. It would be preferable to have the Corporations constituted by a Special Act of the Parliament.

41. It is necessary to formulate an all-India policy in regard to the relative responsibilities of different agencies in the field of seed production and distribution, and secure the acceptance of the Central and State Governments to such a policy for a period of 5 or 10 years. Any uncertainty or confusion in this regard or frequent changes in such a policy will be detrimental to the growth of a seed industry and efficient working of the State and Central Seed Corporations.

VI. QUALITY CONTROL PROCESSING AND CERTIFICATION

42. Seed is superior to grain for growing a crop. Only to the extent such superiority is guaranteed, a seed production programme can be said to be successful. A seed programme without arrangements for quality control is predestined to fail.

The quality control programme for seeds comprises of three aspects:-

(1) Inspection of the field crop from planting to harvest, to ensure that the variety is pure and conforms to prescribed standards;

(2) The processing and packing of seeds to preserve their viability under normal conditions. The processing also ensures that all foreign material, split or broken seeds, under-sized and oversized kernals etc., are removed and that the seeds are free from weeds and seed-borne diseases and are treated with fungicides and insecticides.

(3) Inspection and testing of seed samples from the production stage until the seeds are sold to ensure that the viability of the seeds has not deteriorated during processing or storage.

Inspection of field crops

43. The International Crop Improvement Association has laid down the field standards required for pure seed production of different crops. These standards have to be adapted for each region after a study of local conditions, such as velocity of wind etc. These standards must form part of the contract with farmers or other agencies producing seed. A prescribed number of inspections has to be carried out in accordance with a statistically determined pattern. Roguing of undesirable plants should be vigorously done. The seed grower himself should rogue the fields but failing this the inspecting staff should be authorised to do so. Persistant failure or hesitation to rogue the crop would indicate that the farmer is prima facie unsuited for seed production. For cross-pollinated crops the isolation requirements should be fully met and these should be checked frequently. Similarly, where special operations like detasselling in hybrid maize are prescribed, these must be scrupulously observed.

44. The seed inspector has to be present at the time of harvesting to prevent possible mixtures. This implies that the seed grower should not harvest his crop without prior permission from the seed inspector. The seed should be harvested as soon as possible after the crop has reached physiological maturity. The seed should then be transported to a seed processing plant, where it will be uniformly dried to a prescribed moisture content. While some experts feel that drying in the sun is adequate and satisfactory, others feel that sun drying will be inadequate and unsatisfactory, for the following reasons:

1) Large quantities cannot be handled under sun-drying;

2) The reduction in moisture content cannot be as low as desired, normally moisture content of 10 to 12 per cent is desirable;

3) There is risk of development of moulds or other spoilage.

45. Further investigation is necessary before a scientific conclusion can be reached on the question of sun-drying versus artificial drying. Partly it is a question of economics. Artificial drying is costly but where large quantities are handled, it would perhaps, be convenient and cheaper because it is quicker. When the weather is humid, artificial drying becomes a necessity.

Cleaning

46. After drying the seeds are put through a cleaning machine. This is a very vital operation in that all undesirable material such as broken seeds, mixtures etc. are removed. The cleaning machine also grades the seed, removing under-sized and over-sized seeds. The result is good viable seeds. A further sophistication is to grade the seeds by size or by weight. This has not yet been introduced in India, but with the spread of the use of seed drills and planters, sizing of seeds may have to be adopted.

Seed Treatment

47. The third major operation in processing is to coat the seeds with a fungicide like captan or thirm and an insecticide like malathion or DDT. The seed coating is done mechanically by a machine applying a slurry of measured quantity of insecticides to a measured quantity of seeds. The treatment is against insect and fungal attack during storage.

Bagging

48. The seeds processed in the above manner have to be suitably packed to ensure that viability is retained and sealed to make adulteration difficult. For this purpose the seeds are packed in small cloth or polythene bags. The cloth bags are stitched by special machine and a lead or tin seal is attached to the thread without breaking the seal. A certification tag is attached to the bag indicating the variety, germination percentage, freedom from weeds and mixtures etc. The seal and certification tag constitute the guarantee of quality of seed on the bag.

Seed Testing

49. The samples are drawn from the seeds at the end of processing and tested at independent Government Seed Testing Laboratories. These tests indicate the germination percentage, moisture percentage, the freedom from mixture, freedom from weeds etc. In accordance with international conventions, certain minimum standards are prescribed for each crop. Only seed conforming to the minimum standards is certified. The rest is rejected. The State Governments have established a number of seed testing laboratories and more laboratories are being planned.

Storage

50. The bagged seeds may not be needed for immediate sowing. The seeds are then put under dry storage. If the weather is cool and dry the seeds can be carried over a season on or two without loss of viability. In summer and monsoonish weather air-conditioning and de-humidification is necessary. If the seeds are to be stored for 4 or 5 years, as may be the case with foundation seeds, cold storage becomes essential.

51. Storage in a central warehouse is economic and besides quality can be ensured. But seeds have to be distributed ahead of the sowing season to the selling points. The conditions of transport and storage at railway stations and even in the block seed stores are often not very conducive to the retention of good germination. Routine as well as surprise checks are, therefore, necessary to ensure that the seeds at the retail level are in good condition at the time of sale. Normally, the certification of a seed is valid for 6 months and the date of validity is stamped on the certification tag. At the end of 6 months, the certification inspector should remove all the tags and insist on the seeds being recertified. Even within 6 months, if samples drawn indicate low germination, the certification tag

52. Many administrative problems arise in enforcing a quality control programme of the above type. Seed certification and processing are still new to India, the National Seeds Corporation being the only agency doing such work. There is lot of resistance to roguing of field crops. If certain seed crops are rejected, either at the field inspection stage or during subsequent processing, there is quite an outcry. There are sometimes familiar allegations and insinuations of corruption against subordinate staff while very little concrete proof is offered. Further, uncertified seed and even rejected seed is reported to be sold sometimes as certified seeds by unscrupulous individuals. The farmers have not yet got into the habit of checking the seals and tags. The inspecting staff have to handle the seed growers with considerable tact. While there should be no compromise on seed quality or in adhering to standards, the approach of the inspecting staff should be not that of catching a culprit, but one of training the farmers in doing the job in the right manner.

53. A seed Bill is presently before Parliament and if this becomes law and if requisite administrative arrangements are made, it might be possible to check the sale of low germination seed or other mixtures. However, the seed law cannot ensure certification of all seeds as this is appropriately an entirely voluntary measure.

54. Certification and processing of seeds require experienced and trained personnel. While big processing plants may have their own mechanics and engineers, in many places these will not be available and the agricultural inspector who is essentially a botany or agricultural graduate has to be proficient in handling processing machinery and should be able to undertake some minor repairs. The National Seeds Corporation has a training programme for its inspectors and for officials deputed by State Governments or private companies. The training programme covers also the engineering aspects of processing.

Cost of Certification

55. Certification requires the recruitment, training and maintenance of a competent team of inspectors. As the seed production areas are widespread, considerable travel expenses are also likely to be incurred. This is especially true in the early stages of the certification programme. An estimate of the cost of certification of hybrid maize seed is about Rs. 80/- per acre. It might be much less for self-pollinated crops like paddy. Processing and packing expenses will in addition cost about Rs. 20/- a quintal. Despite these costs, it is not necessary to subsidise a programme of certification or of processing. The cost of certification could be recovered from the seed producers in the form of seed price. The produce of an acre of hybrid maize would provide seed for 100 acres. The ultimate cost of certification to the farmer will thus be less than a rupee. The cost of packing and processing would also be only slightly more than a rupee per acre.

56. There is need for organising a comprehensive programme of quality control for all varieties of seeds. Even pending the adoption of the seed law, the State Governments must take the necessary steps for recruiting and training of requisite staff. Seed Testing Laboratories should be quickly established in States where they have not yet been established. Research on the processing, packing and storage of seeds should be taken up. Much more needs to be done especially on the use of polythene of varying thicknesses for proper storage of seed under the warm and moist climate conditions of India.

Availability of seed processing and seed testing equipments

One of the major bottle-necks in extending seed processing and certification will be the availability of necessary equipment. There is also dearth of some equipment like land levellers, planters, seed drills etc., which can substantially increase seed production from a given area. Most of these equipment can be manufactured in

All India demand for the equipment would be scattered, good entrepreneurs would come forward to take up the manufacture of these machines only if some agencies at the central level take up the responsibilities of collecting the indents of all State Governments and arranging for their manufacture with a programme of phased deliveries. Such an agency can subject the equipment to a quality test before it is shipped to the State Governments.

C O N C L U S I O N

Indian agriculture, as indeed the entire Indian economy, is in the grip of vicious circle of shortages. This vicious circle can be broken at many points. Abundance at anyone point will help overcome shortages at other points. Production of ample seeds of good quality will improve agricultural productivity. Unlike fertilisers or pesticides the production of seeds is entirely a matter of organisation. It requires on foreign exchange or extraordinary technical skill. With determination, with the streamlining of the present administrative structure, and with more emphasis on substance than on procedures, it would be possible to achieve the objectives of self-sufficiency in food and higher productivity in commercial crops.

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SUMMARY OF RECOMMENDATIONS

SEED PLANNING

1. The Extension Officers and those who are in close touch with extension tend to rely excessively on the farmers' preferences for varieties. Extension has to provide leadership and introduce and popularise outstanding new varieties even though the farmer may show an initial reluctance to adopt the same.

2. The period of seed renewal should be laid down for each variety after thorough scientific study.

3. At the stage of planning seed requirements, seed required for sowing each acre of crop must be assured realistically and error, if any, should be on the side of over-estimating rather than under-estimating.

4. As breeder and foundation seeds have to be planned and produced 2-3 seasons in advance of the crop-sowing season, seed planning must be forward looking and take account of changes and trends in agriculture, e.g. increasing availability of water and fertiliser, likely release of new varieties and hybrids.

5. Adequate reserve stock of foundation and breeder should be maintained as a cover against seed crop failures and to meet sudden increases in demand. The benefits from such reserves outweigh the costs including the costs of obsolecense.

6. The National Seeds Corporation and State Seeds Corporations should be asked to build adequate stocks of breeder and foundation seeds with the help of research Institutes and by adding to facilities at Research Institutes, wherever necessary.

7. The release of new varieties must be speeded up and seed production taken up in anticipation of release.

SEED PRODUCTION

8. Approved seed growers should be concentrated in blocks of 8,000 acres around foundation seed farms. Trained Agricultural Graduates must supervise and certify the seed grown in such areas.

9. Only good farmers following efficient farming practices should be selected as seed growers. They should be given all needed inputs. Approved seed growers should not be changed frequently so that the advantages of specialisation may be derived.

10. The possible specialisation of certain areas for seed production should be vigorously explored. Dry areas with irrigation facilities are preferred as they are relatively free from diseases.

11. Foundation seed production should be concentrated in a few select large farms or should be contracted with progressive farmers in compact blocks. Foundation seed production plots should be so located as to facilitate frequent inspection by research staff and others.

SEED DISTRIBUTION

12. Distribution through multiple agencies competing with one another, on a fair basis, would be in the interest of the farmer.

13. The pricing of seeds by all such agencies should be on commercial principles. There should be no hidden subsidies. Subsidies, if provided, should be given equally to all agencies.

14. Seed should be sold only in sealed bags. A copy of package of practices should be available in each such bag.

15. A seed enterprise must be developed, both in the private and public sectors, operating under competition.

16. There should be no restrictions on prices or movement of seeds. Seed prices should provide a high enough margin for seed companies. Departmental distribution of seeds should continue until retail distribution through dealers is developed by seed companies. Such retail distribution through dealers should be actively encouraged.

17. Adequate finance should be provided to develop seed enterprise. The National Seeds Corporation should act as a Development Bank in this regard in collaboration with a leading financial institution of the Central Government.

ROLE OF VARIOUS AGENCIES

18. The National Seeds Corporation should have overall responsibility for ensuring adequate supplies of breeder and foundation seeds of varieties of inter-State or All India importance. The State Seeds Corporations should have similar responsibilities for varieties in use within each State.

19. The National Seeds Corporation should work with and through the State Seeds Corporations. The National Seeds Corporation should build up the State Seeds Corporation, provide overall guidance and participate in their equity.

20. The National Seeds Corporation and the State Seeds Corporation should each undertake to produce atleast 25% of the requirements of the country. The remaining 50% should be met by private seed industry which should be fostered actively.

21. The National Seeds Corporation and the State Seed Corporations should be autonomous in their working, but not in respect of their targets and programmes. The policies of the Corporation have to be in line with the policies of the Government. It would be preferable to have these Corporations constituted by a special Act of Parliament.

22. The all-India policy in regard of the relative responsibilities of different agencies in the field of seed production and distribution should be formulated and accepted by the Central and State Governments. Such a policy should remain unchanged for 5 or 10 years to avoid uncertainties in the development of seed enterprise.

QUALITY CONTROL

23. The certification standards as adopted and laid down by the International Crop Improvement Association and as adapted to our country, should form part of the contracts for seed production.

24. Further investigations should be undertaken to arrive at a scientific conclusion on artificial drying of seeds.

25. The certification tags should be valid only for a period of 6 months after which the seed bags have to be recertified after testing. Within a period of six months, samples should be checked and where deterioration has occurred, seed bags have to be decertified by removal of tags.

26. A comprehensive programme of quality control for all varieties of seeds should be organised. State Governments should take steps for recruiting and training the requisite staff.

27. ...

27. Some agency at the Central level should take responsibility for collecting indents by State Governments for seed processing and seed testing equipment and arrange the manufacture of such equipment with a programme of phased deliveries. Such an agency should subjec the equipment to quality testing before shipment to State Governments.

ANNUAL SEED REQUIREMENT OF CEREALS IN IN

No.	Name of the Crop	Acres in Millions	Seed Rate Lbs.	Quantity of seed Required Tons	Seed Renewal Period Years	Annual Area in Million Acres	BREEDER SEED Acres	Yield Per Acre Qtl.	Quantity in Tons	F Acre
1	2	3	4	5	6	7	8	9	1	11
	FOOD CROPS									
1.	Rice	90	12	1080000	4	22.5	12	15	18.000	1440
2.	Jowar	45	5	225000	3	15.0	39	3	11.700	2344
3.	Wheat	33	30	990000	5	6.6	178	10	178.000	5940
4.	Bajra	29	2	58000	1	29.0	1	5	0.500	106
5.	Maize	11	6	66000	1	11.0	11	6	6.000	1100
6.	Barley	7	20	140000	5	1.4	45	2½	11.250	560
7.	Ragi	6	4	24000	5	1.2	1	4	0.400	120
8.	Small Millets	11	4	44000	5	2.2	2	4	0.800	220
		232		2627000		88.9	289		266.650	11830

ANNUAL SEED REQUIREMENTS OF PULSES &OILSEED

1	2	3	4	5	6	7	8	9	10	11
	PULSES									
9.	Gram	23	25	575000	5	4.6	333	6	200.000	7936
10.	Tur	6	4	24000	3	2.0	3	3½	1.050	262
11.	Other Pulses	32	4	128000	5	6.4	10	3½	3.500	836
	OILSEEDS									
12.	Groundnut (In Kernels.)	17	30	510000	5	3.4	1435	4	574.000	19125
13.	Caster Seed	1	4	4000	5	0.20	1	4	0.4	25
14.	Rape & Mustard	7	2	14000	5	1.4	2	2	0.4	240
15.	Seasamum	6	2	12000	5	1.2	1	2	0.2	120
16.	Linseed	5	6	30000	5	1.0	27	2	5.4	900
		97		1297000		20.2	1812		784.9	29494

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For Participants Only

....II/4.

SEMINAR
ON
AGRICULTURAL ADMINISTRATION
(March 9-12, 1966)

SOIL CONSERVATION PROGRAMMES
(1950-1965)

By

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A STUDY ON SOIL CONSERVATION (1950-1965)

SOIL CONSERVATION PROGRAMMES
(1950-1965)

1. IMPORTANCE OF PROGRAMME.-

Programmes for Soil Conservation and land reclamation form an integral part of the country's agricultural development plans. It is the aim of this paper to assess the achievements of these programmes under the three Five Year Plans and to suggest future plans on the basis of past experience.

Soil Conservation is defined as using each acre of land as to its capability and treating each acre as to its need. Soil is a natural resource, an inch of which takes about 1000 years to form under favourable conditions in nature. If not protected, one may lose it in few years - even less than a decade. Soil erosion is the principal hazard caused by different natural agencies, water, wind and gravity. Ours being a tropical monsoon country, torrential rains wrought havoc in tearing off soil particles from bare surface and carry them away. A 2 inch rain storm releases kinetic energy equivalent to 250 Horse Power over an acre of land surface and the impact of rain drops contributes a major part of the energy for erosion. Similar is the carrying and eroding power of running water which increases considerably with the increase of land slope. For instance, doubling the velocity increases the carrying capacity of the run-off water for the size particle by 64 times and trebling the velocity, the capacity reaches the alarming figure of 729 times. Water flowing at a velocity of 2 feet per second can carry average sized pebbles in its course. Sheet wash of soil by run-off water, if unabated,

beyond recovery by any economic means. Utter destruction of land is seen when the land-scape is criss-crossed with huge gullies and ravines. Similarly, the wind in dry tracts and during dry periods in other areas of the country causes soil erosion. Effects of wind erosion are the sand dunes, moving sands and dust storms. Land slides and slips are yet another form of soil erosion and are of common occurrence due to gravity, mostly in the mountainous regions of the country. These forms of erosion often sweep away villages, cultivated lands, high ways and in fact, the entire land scape. All these types of erosion, causing degradation or wholesale destruction, are much evidenced in the muddy flow of water form cultivated lands, in the vast expanse of the ravines on the banks of the Yamuna in U.P., the Chambal in Rajasthan and M.P. and the Mahi in Gujarat, in the fascinating sand dunes of Rajasthan desert, and the numerous land slides in the Himalayan. Soil is the national heritage and civilization is rooted in the soil. With its degradation, agricultural production rapidly declines and with its destruction land goes out of economic production. It is, therefore, essential to adopt soil conservation measures to control soil erosion and manage the soil and water resource for its sustained high production to meet the need of the country's population.

The programme of watershed management is also becoming increasingly important with the years of plan execution. Essentially every piece of land is a part of the watershed for some flow of water and use and management of several of these watersheds will determine quality, quantity and regularity of water flows

in streams. Once a stream becomes unstable, it takes years for its natural recovery and much money to stabilise it artificially. Unfortunately, over the years almost all of our rivers and streams are getting choked with sediment and moving loads. In consequence, streams with their raised-up beds have reduced volume capacity to cause severe flooding, bank erosion, water logging and land deterioration. Many of our rivers are dry or flow low for greater part of the year. Most of these evils are due to denuded, highly eroded and less pervious watersheds that feed these rivers and streams. The importance of these facts has recently come to be realised as is evident from the huge investments made or provided in plans for multipurpose river valley projects. Fourteen of the river valley projects have already been constructed with a total catchment area of about 109,000 square miles and 11 are under construction with a catchment area of nearly 1,86,000 square miles. Total catchment area of those 25 river valley projects is 2,95,000 square miles or 1888 lakh acres (Appendix I-Table I). Assuming 10 per cent of these catchment areas suffering from serious erosion, there will be about 188.8 lakh acres, or say, 200 lakh acres of land which need to be covered by soil conservation measures. The 25 river valley projects mean huge public investments and if their catchments are not properly managed, heavy silt loads in stream flow will fast reduce the life of the reserviors and the utility of the project. A programme of watershed management is therefore essential to make the river valley projects

In our food production drive land reclamation offers scope for extending area under cultivation now. Waste lands lying unproductive due to saline and alkali problems, or water logging have, therefore, drawn the attention of the planners. In the absence of accurate statistics, rough estimates of the extent of such areas show that roughly 100 lakh acres are saline and alkali soils, about 60 lakh acres are coastal saline land and nearly 30 lakh acres suffer from water logging (Appendix I-Table 2). In the event of a regular survey of these problems over all the states, the acreage under each will increase. In view of the hazards of production in such areas, a programme of reclamation for waste lands has been considered important to increase agricultural production.

2. REVIEW OF SCHEMES -1950-65:-

First Five Year Plan:- The broad objectives of the National Policy on Soil Conservation to regulate land use for optimum utilization of land resources with minimum hazards of erosion are clearly stated in the First Five Year Plan. To achieve these four major steps have been laid down in the report as follows: *

(i) Regulation of land-use as to their land-use-capability, that is, putting good land to intensive use of crop raising and shallow soils with severe erosion or on steep slopes to less intensive use under grass or trees.

(ii) Afforestation and preservation of forests by scientific management.

(iii) Improvement of land-use practices on farm lands such as contour farming, strip cropping, proper crop rotation and fertilization.

* First Five Year Plan pp 292.

(iv) Adoption of engineering measures like bunds, terraces, check dams, water disposal system, gully plugging.

In view of the enormous size of the problem, involving millions of land owners, the First Plan concentrated on research and administrative aspects and social overheads necessary before launching such a mass scale action-programme. The legislation for soil conservation was proposed to provide for (i) powers to execute specified improvements on the farmers' field and cost to be shared between farmers and State, (ii) Co-operative associations of farmers for works on soil conservation and (iii) restriction of usage-practices in certain areas which may be declared protected areas to save larger areas from erosion, floods, silting and dessication. Also, the Plan proposed constitution of (a) a land-utilization and soil conservation board at the Centre and (b) a land-utilization and soil conservation board at the State level for formulation and implementation of the national policy in land utilization and soil conservation. The functions of the Central Organisation were set up as (i) assessment of erosion problems on the basis of reconnaissance surveys, (ii) framing a national policy for erosion control and soil conservation, (iii) coordinating programmes on soil conservation in the River Valley Projects in the States and checking the advance of Rajasthan Desert (iv) Organizing and guiding Central Research Institutions, Soil Conservation Demonstration and Soil Survey Organizations and (v) Publicity and training. These for the State Boards were (i) assessing the problem of erosion

control of erosion and soil conservation, (iii) Drawing up suitable legislation for execution of the programme, (iv) Execution of plans and measures through appropriate Departments and with aids to cultivators, (v) Promoting formation of soil conservation associations and (vi) Framing suitable programmes of research, training of personnel, demonstration and publicity in soil conservation.

Accordingly a Central Soil Conservation Board was set up towards the close of 1953 and works on soil conservation were taken up under centrally executed and sponsored schemes as well as under State Plan schemes incurring a total expenditure of Rs.1.6 crores (appendix I-Table 3). Under the Central schemes, 8 Regional Research cum Demonstration Centres and one Central Arid Zone Research Institute were set up and 250 professional staff were trained in soil conservation. As state schemes, 11 pilot demonstration projects in soil conservation were set up, trees were planted along the sides of 150 miles of roads, pasture improvement and experimental plantations were made over 150 sq. miles and 7 lakh acres, mostly in Madras and Maharashtra were covered under bunding and terracing. Thus, it may be said that during the short period of the First Five Year Plan, the need for taking up a country-wide programme of soil conservation covering survey, demonstration, training and extension was recognised and a beginning was made.

Second Five Year Plan:- During the Second Five Year Plan, more of implementation of national policies, laid down in First Five Year Plan, were taken up. Special

emphasis was given to professional training of personnel and an estimated target of 4000 trained staff of different grades and experience was fixed. Provision was made for survey, classification and preparation of maps for about 100 lakhs acres of land in special problem areas. Attention was drawn to social problems of tribal areas where the hazards of shifting cultivation and uncontrolled grazing are to be controlled with people's co-operation. Need was felt for developing local institutions like panchayats for taking up works on soil conservation to introduce minimum standards of soil-water-management in cultivators' as well as community lands. Towards the above mentioned goals, the progress made and expenditure incurred are given in Appendix I-Table 4. It is observed that during the second Five Year Plan the total expenditure incurred in soil conservation was about Rs.22.5 crores, of which nearly Rs.20.4 crores were spent on state schemes mostly of Bunding and terracing, afforestation and pasture development. About Rs.1.66 crores were spent on research, training, soil and land use survey and the rest of the expenditure was incurred on demonstration. Nearly 25.0 lakh acres of agricultural land have been covered mostly by bunding and terracing under State Schemes of soil conservation and about 4.40 lakh acres have benefitted by afforestation and pasture development works. In all 18 demonstration Projects in dry farming out of 40 proposed in arid and semi arid areas and 6 watershed demonstration projects were completed during the plan period. Detailed and reconnaissance soil

Demonstration Centre was set up at Chhatra (Nepal) for soil conservation problems of Kosi river valley project. The Centre at Jodhpur was reorganized and developed into Central Arid Zone Research Institute in collaboration with UNESCO. At Jodhpur a Pasture development scheme was started to stabilize shifting sand. Under the training activities, 1070 technical personnel of different grades were given professional training. Central Board of Soil Conservation prepared a model Soil Conservation Bill and recommended the same to the States for adoption with modification, if needed. Enactments for preparation and execution of soil conservation schemes were made in 11 States and 3 Union territories out of total 15 States and 5 union territories.

Third Five Year Plan:- Under the Third Plan programme, national policy on soil conservation essentially remained the same as in previous plans. It, however, attempted to estimate more clearly the extent of the problem and emphasized the State schemes. Since information on upto date achievements is lacking, available data will be considered for assessment of works. The programmes, the target and the financial out-lay are summerised in Appendix I-Table 5. It is seen that the Third Five Year Plan provides a total outlay of about Rs.73.3 crores on Soil Conservation, of which nearly Rs.60.3 crores are allocated for State Schemes and Rs.13 crores are for the Centrally executed and sponsored schemes. Out of the total allocation made for the State Schemes, Rs.40 crores are provided under contour bunding and terracing, Rs.7 crores for afforestation and pasture development, Rs.5.6 crores for reclamation of saline and alkali soils and the rest is for ravines, dry farming, research and

demonstration, survey etc. Out of Rs.13 crores provided for centrally executed and sponsored schemes, about 11 crores have been provided for soil conservation works in river valley projects and the remaining Rs.2 crores are distributed over the schemes of soil and land use survey, ravine survey, research, training and demonstration of dry farming methods.

The progress made at the end of 1963 show that programme of contour bunding and terracing in agricultural land has covered only 23 lakh acres out of the plan target of 116.8 lakh acres, schemes on dry farming have covered about 30 lakh acres against the target of 220 lakh acres, projects of afforestation and pasture development have covered 2 lakh acres against the target of 6.3 lakh acres, about 0.2 lakh acres of saline and alkali soils reclaimed against the target of 2 lakh acres. Only 0.04 lakh acres of ravines were reclaimed out of the target area of 0.3 lakh acres. The survey schemes of the state have covered 3.8 lakh acres as against the plan target of 30.6 lakh acres. Of the Centrally executed and sponsored schemes, soil and land-use survey achieved, the target area of 150 lakh acres and the schemes on demonstration of dry farming methods have set up 43 projects out of the target of 45 numbers. Professional staff of different levels numbering 768 have been trained as against the plan target of 2050. One out of 2 more research Centres has been set up. In the river valley catchments, only 3.53 lakh acres have been covered by soil conservation measures out of the target area of 10 lakh acres.

works either under Forest Departments, Agriculture Departments or Irrigation Departments. The achievements for 1961-63 period as discussed above, however, reveal that except for all India Soil and Land Use Survey Scheme, the progress in all other items is much below the desired targets. In the next two years even if the speed of execution accelerates, the physical targets will not be achieved.

Proposals for Fourth Five Year Plan:- While framing proposals for the Fourth Five Year Plan and projection for the Fifth Five Year Plan, the working group on Soil Conservation, Ministry of Food and Agriculture, Government of India has reviewed the planning and implementation of various soil conservation programmes of the First, Second and Third Five Year Plans. The general observations made are:-

(i) The whole programme of soil conservation has been reduced to single practice execution without proper co-ordination among the implementing agencies. No integrated plan of land and water development on watershed basis exists.

(ii) Paucity of trained personnel for planning and execution appears to be chronic.

(iii) There is the lack of approved national standards for the planning and execution of these technical works. In consequence there is no uniformity of methods adopted by the states nor schemes are amenable to technical scrutiny and evaluation.

(iv) Lack of a strong country wide soil conservation programme appears to be due

to a weak organisation at the Centre to handle them.

(v) Uncertainity of State finances and procedural administrative difficulties also contribute to the slow progress of works.

(vi) Effective contribution from block agencies and Panchayats are not forthcoming and much less is the people's participation to make it a mass programme.

(vii) Soil and land use survey reports are yet to make an impact on the land users.

(viii) Programme of Research, Training and Demonstration is not strong enough to support the action programme.

Appreciating the above observations, the areas for soil conservation, in the general approach for agricultural development in Fourth Five Year Plan, have been recognised to be:-

(i) About a total of 2000 lakh acres of unirrigated area suffering from erosion.

(ii) Areas restricting production due to water logging and soil salinity.

(iii) Water management and field drainage in the irrigated areas.

(iv) Ravines.

(v) Land management in the catchments of the river valley projects for sediment control and flood reduction.

In order to implement the programmes, watershed will be the unit for planning soil conservation

Plan it is proposed to cover about 200 lakh acres under soil and water conservation using watershed as the planning and implementing unit. This programme replaces former schemes of (a) controur bunding and dry farming in agricultural land and (b) afforestation and pasture development in non-agricultural areas. The programme of stabilization of ravines and table lands will cover about another lakh acres. The schemes on irrigation, water management and field drainage enter the plan for the first time to take up land levelling, aligment of field channels, field drainage and proper water use over a proposed area of 15 lakh acres. It also envisages adequate soil survey, research and training programmes as the above schemes of the plan demand. Under the proposed Fourth Five Year Plan, a total area of 254 lakh acres will be covered by soil conservation measures and 550 lakh acres surveyed with a total outlay of Rs.275 crores (Appendix I-Table 6).

Fifth Five Year Plan Projections:- When the Soil Conservation Programme proposed under Fourth Five Year Plan is implemented, it will build up the country's technical potential capable of annually executing all field plans over an area of about 14.9 lakh acres. Besides, a built up survey potential will be available to take up additional load of soil survey over about 10 lakh acres annually. On these premises, planners expect that at the end of Fourth Five Year Plan, the built up technical potential at this rate will be at a level, capable of completing all field programmes over 380 lakh acres along with soil survey for 650 lakh acres. In the Fifth Five Year Plan, it is projected, a little higher emphasis will be given to water-use-management, reclamation

of saline and alkali soils and soil conservation in the river valley projects. With the developed technical potential, the Fifth Five Year Plan envisages a possible coverage of field programme over 500 lakh acres and soil survey over an area about 650 lakh acres (Appendix I-Table 7).

The achievements made during the three Five Year Plans, as discussed above, are short of desired goals and compared to the estimated problem area of 2000 lakh acres needing soil conservation, the progress made is low. The single practice of soil conservation measures like bunding or terracing have been executed as per programme without the benefit from other associated agricultural development works. In consequence, anticipated increase in production due to the measures undertaken failed to be achieved. While framing the outline proposals for the Fourth Five Year Plan these short falls and deficiencies have been appreciated. The general approach for soil conservation programme, planning on watershed basis has been proposed to cover the earlier schemes on bunding and terracing in agricultural land as well as those for afforestation and pasture development. The single practice of contour bunding or terracing will thus continue as in past for the agricultural land in the planning of soil conservation measures on watershed basis. It is, therefore, suggested that:-

(i) Soil Conservation measures, in the Fourth Five Year Plan need to be integrated with the package of practices in formulating

as village-plans at the lowest end of District Plans. Annual Plan targets may, therefore, be kept as number of villages planned and developed as a block for the target area. This will help the ultimate objectives of establishing a viable soil conservation programme for our 5.6 lakh villages involving nearly 7 crore rural families spread all over the country.

(ii) The projects for reclamation of ravines, saline and alkali soils and water logged areas have so far not made any head way in yielding economic production. Scattered efforts to tackle these problems may not produce desired results. These are also beyond the individual farmer's economy. It is, therefore, suggested that these costly projects may be undertaken by the States or Central Government after proper technical investigation and economic analysis to develop plantations of fast growing economic species or to establish state farms for production.

(iii) Programme of Irrigation and drainage enters under soil conservation measures for the first time in the proposed Fourth Five Year Plan outline. It is suggested that result demonstration for efficient irrigation and technical assistance in the cultivators' farm may be given preference, for proper water use in irrigated area.

(iv) Soil survey is essential to delineate soil boundaries, collect soil characteristics and interpret them for different uses and prepare soil reports with soil maps for land users. It is a long term process and a large organization both at State and Centre level is needed to complete the job. The development programmes of the country, need soil information and maps to demarcate resource areas, formulate development plans for field execution. Air photography and air-photo mosaics and air-photo interpretation satisf. this need for covering the area in comparatively a short period. It is, therefore, suggested priority may be given to obtain air photo and air photo mosaics for problem areas to hasten supply of resource information and field maps for programme implementation.

(v) Research is the back-bone of successful extension programmes. Research needs in soil conservation may, therefore, be collected by a national inventory in the field and passed on to Indian Council of Agricultural Research for undertaking suitable research programmes for finding answers to field problems. Central Soil Conservation Research Centres should, however, carry out result demonstration in co-ordination with States and evaluate

3. PLANNING AND EVALUATION OF WORK DONE:-

Programme fomulation:- The Planning Commission with the Central Ministries and National Development Council processes the plan programmes to achieve broad national objectives of progressive step up of overall rate of investment and national income, keeping pace with the population growth. The first two plans were expected to give an annual rate of growth of 3.5 per cent and third Five Year Plan aims to achieve 5 per cent. The Fourth Five Year Plan, however, is proposed to yield a 6 per cent annual rate of growth in the national income. In such a state of developing economy an efficient and progressive agriculture has been considered as the foundation of this advance. Soil Conservation, therefore, in the integrated agricultural plan programmes received its due priority to aid national agricultural production efforts. The working group in the Department of Agriculture, Govt. of India, has in fact estimated a projected population of 55.5 crores in 1970-71 after the 1960-61 census population figure of 43.9 crores and computed national demand for food grains to be 1220 lakh tonnes in 1970-71. In view of this, the Ministry of Food and Agriculture, Govt. of India have taken the demand for food grains during proposed Fourth Five Year Plan period as 1200 lakh tonnes to meet the need of human population and livestock feed without any surplus for buffer stock. It is anticipated to achieve production of 920 lakh tonnes of food grains at the end of Third Five Year Plan in 1965-66. Increased importance to Soil Conservation can be seen the from expenditure incurred or outlays provided in

different plans, which are Rs.1.o crores in First Plan, Rs.22.5 crores in Second Plan, Rs.73.3 crores in Third Plan and Rs.275 crores proposed under Fourth Plan.

During the First and Second Five Year Plans, approach to agricultural development consisted mainl, in formulating general programmes for additional facilities like irrigation, soil conservation, land reclamation, increased supply of material inputs and the like. These efforts were dispersed all over the areas in the country and the desired goals of production were not achieved. In 1960.61, the Intensive Agricultural District Programme (Package Programme) was initiated to test the principle of concentration of efforts in selected areas and adoption of package of practices for raising production. It has beenextended in 1962-63 for 8 main crops and crop areas of the country. In formulating the draft Fourth Five Year Plan proposals on agricultural developments, the Ministry of Food and Agriculture, Govt. of India has kept this area approach in view for integrated programme with concentration of efforts in areas suitable for crop and live stock production. A minimum programme of development all ver the country, is, however, envisaged and the special programme is to be superimposed on minimum programme in the selected areas. An ultimate objective is also proposed to demarcate following potential resource areas of the country alongwith the type programme to be undertaken therein:

(i) Areas for staple crops where there is essured rainfall or irrigation facility.

(ii) Areas of inadequate rainfall suitable for

(iii) Areas suitable for fodder production and intensive dairy development.

(iv) Hinter-lands of urban market, good for intensive production of vegetables, fruit crops, poultry, piggery etc.

(v) Areas suitable for orchard plantations and other special crops.

In the plans, proper land use planning, that is, using the land as to its capability for sustained economic production of agriculture, Forestry or livestock has not found much appreciation. Inview of rapid physical and economic environment changes in areas due to other development programmes land use planning and need for crop regulation has been recognised in the formulation of draft Fourth Five Year Plan. This has also placed stress on carrying out research programme in land use-planning and cropping pattern to guide action programmes.

Planning Process:- Procedure followed by the Planning Commission evolves, the plan in stages through a set procedure exposing the objectives, policies, programmes and projects to extensive discussions at political, executive and technical levels by the State and Central Governments. In practice, however, planning at the lowest level appears to consist of planned targets and allocation of resources, descended from the higher levels. Our National Planning procedure remaining at par excellance, there exists the lack of effective local planning in which the cultivators themselves are involved. It is clear that plans not accepted by the land users who alone carry them out will not yield results. Similarly to plan for activities which cultivators would do in any

case is obviously wasted effort in our critical food situation and with our limited resources, It is, therefore, suggested that:

(i) the soil conservation measures should not be planned in isolation but integrated with other agricultural programmes as a package of practices. They should be offered to the cultivators and other people of the villages against the statistically expressed targets from higher sources as guides to what is needed, to measure resources and to challenge local interests,

(ii) after the production goals set locally and methods to achieve them agreed upon, the professional staff members should develop the working plans for the villages to aid the cultivators achieving the accepted goal and evaluate them,

(iii) areas of individual cultivators' responsibility and that of the community may be specified in the local plan for implementation.

Administrative organisation and plan implementation:- In accordance with the recommendation made in the First Five Year Plan report, Central Soil Conservation Board was set up in 1953 with the function given earlier under para 2 as a high power organisation at the Centre for implementing national programme in soil conservation through the State Governments. Similar State Soil Conservation Boards with high power were set up in

Kerala and U.P., these Boards are also responsible for execution of the schemes in soil conservation, Central Soil Conservation Board prepared a draft model bill and sent the same to State Governments in 1955 for enactments by States. Accordingly most of the States, except west Bengal, Assam and some of Union territories enacted legislation to facilitate implementation of soil conservation works in the field. Besides, there exist other acts like Indian cattle trespass act 1871, Indian Forest Act 1927, the Madras Preservation of Private Forests Act 1949, Madras Hill stations (Preservation of trees) Act 1955, and Damodar Valley Corporation Act 1948 which help taking up actions having bearing on soil and water conservation.

State Acts on soil conservation provide for preparing and executing of schemes on a variety of problems for the purpose of (i) Conservation and improvement of soil resources (ii) prevention and mitigation of soil erosion. (iii) protection of land against damage by floods or drought and (iv) reclamation of waste lands. The legal provisions made in the Acts show that a good foundation has been laid for the enforcement of soil and water conservation in the country. But a study of the soil conservation schemes and works executed by the States points out that actual execution has started only on a few of the exhaustive list provided for, such as bunding and terracing, reclamation of waste lands afforestation etc. It is, therefore, observed that inspite of the existence of sufficient legal provisions on various aspects of soil conservation, their enforcement has remained weak.

In the Union Ministry of Food and Agriculture, the Central Board of Soil Conservation co-ordinates the implementation of soil conservation programmes of the States. The Secretary of Agriculture with the Advisors on Soil Conservation administers the Central schemes and looks into the progress of State Schemes. In most of the State there is a State Soil Conservation Board to co-ordinate soil conservation schemes at the state level. There are District Development Committees at the district level which discusses the schemes on land development and soil conservation.

In almost all States, Director of Agriculture and Chief Conservator of Forests under the administrative control of State Secretariat, are responsible for executing the Soil Conservation Programmes with supervisory staff at Division as well as District level. It is interesting to note (from the table 9 Appendix I) that soil conservation programmes in forest areas are being executed by State Forest Departments under their regular organisational set up with additional staff at different levels. Similar pattern of organisational set up for soil conservation works in agricultural areas is seen only in the case of West Bengal but other States have a special soil conservation set up under the Director of Agriculture other than Deputy Director and Distrcit Agricultural Officers.

It will thus be observed that administrative organisations, social institutions and legal provisions have been built up over the years in all the States for implementing the Plan programmes. In the Govt. owned

programmes through the existing Forest Departments. In the agricultural land, however, several technical Departments at the State level assist the farmer for production. Soil Conservation measures alone are being implemented by the Director of Agriculture through special agencies other than District Agricultural Officers under most of the Department of Agriculture in the States. In consequence co-ordination among the various Departments at State level as well as at the field level is very much lacking in the programme for agricultural land to achieve desired production goals. The Programme Evaluation Organisation of the Planning Commission in their study on soil conservation programmes in agricultural land have extensively cited the deficiencies of co-ordination in programme execution. The high level team on Agricultural Production sponsored by Ford Foundation, as well as the 3 membered TCM Consultant group on land and water resources in India in their reports have pointed out weakness in inter-agency coordination. The problem of co-ordination and integration is, indeed, obvious in that too many independent agencies implement wide range of programmes, in isolation, to assist the farmer for production. Diffusion of programmes results in diffusion of personnel and resources as well as responsibility so that none bears publicly the brunt of responsibility for the success or failure of the programme. This also helps perpetuating the chronic problem of paucity of trainned personnel. Apart from the above it has often been reported that the technical personnel charged with the implementation of programmes are heavily burdened with the responsibilities of financial accounting,

service items like supply of production inputs and reporting. As a result they pay much less attention to the sound execution of technical programmes. Numerically weak strength of technically qualified staff at the level of programme implementation makes the situation worse. To meet this problem it is suggested that:-

(i) Soil conservation measures should be integrated with the package of practices meant for increasing production and implemented in the field under Department of Agriculture as a unified agency.

(ii) Under the State Secretariat and existing State production Boards or Soil Conservation Boards, Director of Agriculture may function as the chief administrator of the programme. Research and other duties of the State level specialists of the agricultural Departments should be transferred to the State Agricultural Universities and the specialists will then form the technical team in assisting the Director of Agriculture in all technical matters regarding planning and affording technical as well as extension guidance to the field staff in implementing the production programme. The technical team, apart from the subject matter specialists may include a statistical unit for correct reporting, an information unit for publicity and supply of extension material

for farm and watershed planning. District Agriculture Officer may be taken as the Chief Field Executive for all the agricultural production programme including soil conservation in the district and his staff strengthened suitably with specialists as the district programme demands. District production council functions as an advisory body for district programme. The Block Officer should be an agricultural graduate and work under the District Agricultural Officer for production programme including soil conservation his staff being strengthened by at least 4 farm planning units headed by an agricultural graduate supported with two non technical hands preferably matriculates. These farm planning units at block level will develop village plans for soil conservation and agricultural production as the demand for the same is made by the VLW from the village panchayats. Achievements may be assessed on the number of village plans implemented and increase in production effected.

(iii) For an annual economic and technical evaluation of the whole programme including Soil Conservation, an independent evaluation unit in the State Secretariat as well as under the Secretary of Agriculture in Union Ministry be set up. To make the technical evaluation meaningful,

National and State technical guides should be furnished to field executives to help assessing standards of technical execution.

(iv) The responsibility of supplying service items to cultivators should be with the co-operative organisations and those of financial aspects of the programme transferred to a suitable credit organisation with appropriate co-ordination with the district agricultural organisation.

Personnel:- The organisational set-up as detailed above involves top administrative personnel, scientists and technicians of different levels as well as consultative or advisory committees and councils which bring in the association of non-officials and land users with the programme. The field execution of the programme, however, rests solely on the scientists and technical personnel drawn from different disciplines like Agrnomy, Soil Science, Engineering and Forestry. Their aids are non-scientific personnel with in-service professional training. The scientific and technical personnel are being given training in soil conservation from the Second Five Year Plan onward and at the end of the Third Five Year Plan it is likely to have 594 officers and 2771 assistants trained for State programmes. In the event of draft Fourth Five Year proposals in Soil Conservation taken up for execution, the working group estimates that the total requirement of trained personnel will be 1550 officers and 8300 assistants of which 1200 officers and 7400 assistants are needed for field programmes.*

In the event of administrative reorganisation suggested earlier, is effected the position of technical personnel for the implementation of the programme will significantly improve and more so, with the increased number of agricultural colleges and agricultural universities. There, however, will remain a need for field training of the professionals as well as non-professionals who will form the bulk of the executing agencies. It is, therefore suggested that:

(i) a short programme of 2 to 4 weeks job-oriented training should be organised in State locations as well as at the Central Training Centres for the professional field staff;

(ii) short orientation courses should also be given to higher grade officials in planning, extension and National Policies in Training Centres of the Central Government.

(iii) to maintain a good standard of technical efficiency of the field staff, they should be supplied with approved technical guides with standards and specifications of practices in Agriculture and Soil Conservation. Also they should be posted from time to time with the latest developments in their field of interest.

(iv) To attract professional personnel to take agriculture and soil conservation as a career, the service conditions should improve.

<u>Finance</u>:- The financial involvements for soil conservation programme are earlier given under item 2

while reviewing the schemes. Government of India bears the full expenditure incurred under centrally executed or centrally sponsored schemes like those of Central Research Stations, All India Soil Survey Organisation, Dry Farming Demonstration. The Central Govt. also finances State Plan schemes in soil conservation under a well defined policy of financial assistance to the States. During the First and Second Five Year Plans the following was the pattern of loans and grants to states:-

(a) Loans:- Loans were given to meet the entire expenditure on a scheme and State Govts. undertake to repay the amount with interest within a stipulated period not exceeding a maximum period of 15 years.

(b) Grants: Grants (subsidies) were given by the Central Govt. to State Govts. to meet a part of the net expenditure on a soil conservation scheme-Quantum of such assistance varying as to the merit of each scheme:

(i) Total subsidy of a scheme should not exceed 25% of the total cost of the scheme and to be shared equally by the Centre and State (Central share - 12½%).

(ii) In case of afforestation schemes, however, the subsidy may go upto 50% of the total

(iii) A subsidy upto 100% can be given for the works part of the Pilot demonstration schemes (inclusive of those in river valley project including work charged staff. Dry farming demonstration schemes can have 50% of the cost of work charged staff as subsidy.

(iv) State research schemes and training are aligible for grant on a 50:50 basis of approved expenditure.

(v) Soil Conservation schemes in tribal areas will get Central grant of 75% and the State Govt. bears the rest 25% of the cost.

The above pattern of Central Assistance was modified, as under, during the Third Five Year Plan:

(i)	Strengthening Soil Conservation Organisation -	- 50% grant.
(ii)	Research Training an survey.	- 50% grant.
(iii)	Soil Conservation in agricultural land, afforestation and pasture development.	- 25% subsidy (Centre = 12½%) (State = 12½%)
(iv)	Soil Conservation in hilly areas.	- (a) 50% Loan (b) 50% Subsidy (shared by Centre & State)

The pattern has been adopted apparently for administrative convenience and not relevant to technical aspects of the schemes, in adopting a new practice. This may be seen, in the pattern of financial assistance of 25% given to cultivators for soil conservation in

agricultural land as provided above. In Maharashtra, Mysore, Gujarat, Madras and Andhra Pradesh, 33⅓ per cent of the total cost incurred on material and labour for the soil conservation works, is added up as establishment charges in order to arrive at the amount, of which 25% is to be given as subsidy and the rest is treated as a loan to the cultivators at an annual interest of 4½%. This means that the subsidy given by the Government only covers the overhead establishment charges rather than contributing towards actual cost of work and the aid given is in practice, a book adjustment. The procedure in this regard needs revision.

The cultivators' economic condition, in general, does not allow him to take risk in adopting new practices. Sometimes there may be a dight initial depression in the production, in adopting some soil conservation measures like bunding and terracing or while taking up land-use adjustments. To meet this probable fear of initial loss in production due to adopting a soil conservation measure, there is no provision of financial compensation for the cultivator. It is, therefore, suggested that:-

(i) Procedure followed in some States in giving 25% subsidy for soil conservation works in agricultural land need to be reviewed and additional provision for compensation may suitably be made to meet initial loss due to adoption of a measure.

(ii) Financial compensation may also be provided to attract land users to take up land-use-adjustments in critically eroded areas,

Union - State Field responsibility:- From the points already dealt, it will be observed that the Central Govt. have assumed field responsibility only for the centrally executed schemes like the Regional Research Training and Demonstration Centres, All India Soil and Land Use Survey. The field responsibility of all other State Schemes is that of the State Governments. Those for the Union territories, however, rest on the Union Govt. Besides, Central Govt. representatives visit State works from time to time for reporting progress of State Schemes. Agriculture being a state subject, programme planning in detail and its successful implementation in the field to achieve desired production goals remain the primary responsibility of the States. In the larger context of a National Policy and country's drive for food production, the Centre, however, has the main role to play in formulating National Plans fixing policy objectives and targets. Also it offers technical leadership in setting up National standards for technical practices and in affording technical assistance. As called for, Central Organisation undertakes before and 'after' programme research and evaluation to suggest changes, organises dissemination of knowledge through regional and national conferences, mass media etc. toat in, extension information, renders financial as well as training assistance and arranges overall review of programmes by teams of International experts. Action has been taken by the Centre in these aspects but strengthening of the items like affording technical leadership, extension information and programme research and evaluation, need to be taken up. Also, in view of the integrated approach suggested earlier for package of practices including soil

conservation measures, there is the need for a unified agency to be responsible for the programme in the Union Ministry of Agriculture, apart from these activities of planning commission. It is therefore suggested that:

(i) all the activities concerned with the production drive including soil conservation programme should be under the unified agency of Extension Organisation in the Union Ministry of Agriculture for effective State - Centre Co-ordination in the field of programme planning, implementation extension information, training, technical assistance, reporting and evaluation by suitably reorganising and strengthening the existing structure,

(ii) it is desirable to establish zonal units for on-the-field technical assistance in programme planning and implementation which may be done by reorganising and transforming existing regional organisation in soil conservation. These units should also assist States in developing technical guides in the lines of National technical guides to be developed by Extension Organisation in the Ministry,

(iii) efforts on extension information and dissemination of experience and knowledge through regional and national meets need be strengthened,

(iv) States should now increase in-service job-

(v) Centre should take up national inventory of soil and water resources of the country to develop long term resource planning of the regions for maximising their utilization.

Training and extension works:- Imparting of specialised training in Soil Conservation to the officers and graduate Assistants deputed by various State Departments, Union Territories and Central Organisations remained the responsibility of the Centre over the plans. The Central Soil Conservation Board now imparts training for officers twice annually at 2 Centres reducing the duration of course to 5½ months. Graduate assistants are being trained at 4 Centres running two sessions in a year of 6 months duration. The working group on soil conservation, Ministry of Food and Agriculture, Govt. of India, expects to build up technical resources at the end of Third Five Year Plan to 594 trained officers and 2771 trained graduate assistants against an estimated field demand of 1200 officers and 7500 graduate assistants for proposed soil conservation works during Fourth Five Year Plan.*

When the soil conservation programme is integrated with the other package of practices for production, personnel involved in planning and implementation will assume still larger numbers. To maintain high standard of technical execution in the field, a systematic and continuous job-oriented training programme is considered essential for the personnel executing the programme. This will involve defining specific job responsibility and technical standards to help fixing the exact

*Source: Interim report on soil conservation by working group for draft proposals of Fourth Five Year Plan, Ministry of Food and Agriculture, Govt. of India.

training need. It is, therefore, suggested that:-

(i) the job responsibility should clearly be defined and technical standards prescribed so as to enable the states to improve the staff efficiency by providing them adequate in-service training accordingly, in work location.

(ii) the programme supervisors should determine the training need for the staff on performance in the field and schedule training load for the individual employee to effect continuous improvement to staff efficiency.

As regards the extension aspects, the programme Evaluation Organisation, Planning Commission, in their study report, 1962, has pointed out that the Block agencies in most States did not play much role in preparing the people to undertake soil conservation, nor they fulfilled the follow up actions. Also in majority of states. Institutions like Panchayats and co-operatives have not been associated with the People's programme of Soil Conservation. In few States, Panchayats have been associated only to persuade the land owner for soil conservation but no positive role in the field execution of the programme, has been assigned. In Maharashtra, however, farmers' Unions are formed for planning and execution of "Bunding" programme. The Soil Conservation programmes in the field, during the Third Five Year Plan periods did not, indeed, transform into a People's programme. Much more needs to be done on extension education of cultivators to motivate them effectively and to involve them in the programme.

standing of social-psychology, communication process and extension methods to secure effective changes in human behaviour to take desired action. It is, therefore, suggested that:

(i) programme of extension education should be intensified especially through result demonstration organising training camps for village leaders and young farmers, information bulletins and other visual aids.

(ii) an intensive programme will need co-ordinated units of information and field publicity, both at State and Centre's level, in the Departments responsible for execution of the programme.

EVALUATION OF WORK DONE:-

At the Centre's level, annual review are compiled from State reports as to the progress of financial expenditure and physical targets. Discussions held between Centre and State officials bring in the periodic review to take steps whenever necessary. At the State level the executing organisations hold their review after field inspections and take steps to achieve the targets. Central Govt. however, control the overall financial aspects of the schemes as far as the loans and grants are concerned for the State projects and they hold the full budgetary and technical control for the centrally executed or sponsored soil conservation schemes. State organisations control the technical as well as budgetary aspects of the State Schemes. Planning Commission in consultation with National Development Councils, Union Ministries and State Govts., approve plan programme and allocate funds.

Programme research and evaluation are essential for a mass action programme like soil conservation which involves tremendous amount of national resources-financial, physical and personal. In view of the critical nature of increased food production, determing the efficacy of the programme and ways to improve them receive top priority. The Programme Evaluation Organisation of Planning Commission has undertaken, since 1952, such evaluations of agricultural programmes and its intensive problem oriented studies on soil conservation have been helpful in identifying problems and difficulties. The Planning Commission has also set up an Advisory Board to guide its Programme Evaluation Organisation and to assist Central Ministries and State Governments in developing evaluation and arranging training for personnel. During the Third Plan Maharashtra set up an evaluation wing in the planning section of the Finance Department and its State Bureau of Economic and Statistics, carried out evaluation studies on several items including that for the area under improved agricultural practices. In Andhra Pradesh a State Evaluation Committee reports on a number of Plan schemes like State Seed Farm, Compost Schemes, consolidation of holdings etc. Within the State Planning Department, the Economic and Statistical Organisation of the Punjab have prepared reports on such schemes like housing schemes, survey of improved agricultural practices in Community development areas. In Rajasthan there is a permanent evaluation organisation to undertake, among others, a continuing study of Panchayati Raj. In Madhya Pradesh and West Bengal Evaluation studies of

and continuing programme of studies of Plan Schemes.

States as well as the Centre have, therefore, appreciated the significance of evaluation of programmes and it will be useful if the executing agencies examine the findings and adopt such recommendations as may improve the development programme. In this context certain amount of social and economic research has also been undertaken for development programmes by the Research Programmes' Committee of the Planning Commission sponsering 170 research projects on various studies in Universities and Institutions. With funds from Ford Foundation, five leading research institutions have taken up research studies including the basic problems of agricultural development. A good beginning has, thus, been made in evaluating programmes but it needs to be intensified for agricultural programme in view of the complex socio-economic aspects of land users involved in these problems.

In the larger interest, evaluation studies may aim to indicate how economic principles can be applied to the problem of conservation and agricultural production especially regarding input-output relations, farm planning and efficiency of technical practices individually as well as in combinations in order to decide policy, financial assistance, arranging credit, accelerating adoption of technical practices. Simultaneously, evaluation on administrative organisation and extension activities motivating social action, will help to asses programme planning and execution. In carrying out the evaluation programmes specific statements of precise objectives and analytical procedure will yield realistic results. Further, an agricultural programme

(v) There should be defined goals and procedures for a specific evaluation programme with provision for collection of dependable data as grossly incorrect data are worse than no data.

(vi) In the best interest of evaluation programme, the evaluation agencies should be associated, as far as possible, with programme planning and execution.

(vii) In the administrative structure of programme-planning and executions, intensive study of vertical relations and evaluation of flow of action programme through the structure will be significant in assisting programme administration.

4. SUMMARY OF SUGGESTIONS:-

Immediate:-

(i) Soil Conservation measures in Fourth Five Year Plan should be integrated with the package of practices in formulating the programme for agricultural production on the basis of potential-area-approach and implemented as Village plans. The annual physical targets should be fixed as number of village plans developed and executed in a block for the target areas.

(ii) The reclamation of ravines, saline and alkali soils, and water logged areas should be taken after thorough technical investigation and economic analysis. These costly schemes may be taken up as pilot projects by the Government to

including soil conservation involves a variety of factors and when all the factors become optimum, the action programme yields desired results, in production. Since it shows a time lag, a continuous research and evaluation study on a specific project is necessary to arrive at valid conclusions. It is therefore suggested that:

(i) programme research and evaluation need to be intensified on the agricultural development plans including soil conservation. Besides the evaluation units in the executing agencies, Agricultural Universities should take up evaluation of specific agricultural programmes in the States under their wing of extension and Agricultural Economics, adopting standard analytical procedure and with defined objectives.

(ii) Case studies of successful farmers representing different income groups of land users need to be undertaken to help suggesting actions in the soft areas of the programme.

(iii) Key village plans or farm plans should be executed and assesed for 'before', 'after' and 'in process' evaluation and for their use as Bench Marks while evaluating programmes in the area.

(iv) Special attention should be given to establish input-output relations while evaluating soil conservation measures as a part of agricultural production programme to assist formulating package of practices.

demonstrate economic utilisation of the problem areas under plantations of fast growing species or raising crops after reclamation.

(iii) Programme in irrigation and drainage should include result demonstration and on-the-farm technical assistance for efficient water use in crop raising.

(iv) Soil survey programme needs to be strengthened. Priority should be given to obtain air photos and photo mosaics of suitable scales for use in soil survey, soil conservation and field implementation of agricultural programmes.

(v) Research needs in soil conservation be determined by a national inventory and passed on to Indian Council of Agricultural Research for undertaking research to find answers to the problems. The Central soil conservation research centres should collect basic data on efficiency of practices by taking up field studies in collaboration with States.

(vi) In formulating plans, Soil Conservation measures should be integrated with others as a package of practices to increase production and to suit to cultivators' resources and ability for his willing acceptance.

(vii) After fixing the local goals of production, the cultivators should actively be involved in developing the plans to meet

the challenge and implement the same as his own under the technical guidance of the professional staff of the Government Organisation.

(viii) Areas of individual cultivator's responsibility and that for the Community, should be specified in the local plans for execution.

(ix) All soil conservation measures integrated with other agricultural programmes need be executed under the Department of Agriculture and the Director of Agriculture with the State level specialists should be the Chief Administrator of the State programme. District agriculture officer with special staff will be the chief executive of the District programmes controlling all the agricultural programmes through the Blocks. Block agricultural staff should be strengthened. with at least 4 farm planning units each under an agricultural graduate to afford technical assistance in cultivators' field. All technical staff should be free from other functions to devote their time fully for technical works.

(x) Independent evaluation units should be set up in the State Secretariat and under the Secretary of Agriculture in the Union Ministry to undertake annual evaluation to enable effecting immediate changes in the programmes. For effective technical evaluation, approved standards and specifications should be prescribed as controls.

(xi) The responsibility of supplying service items should be transferred to co-operatives and financial aspects to a rural credit organisation, closely co-ordinating at the District level with the District Agriculture Officer.

(xii) The programme of training of personnel needs to be strengthened by holding shorter on-the-job courses of 2 to 4 week duration at State and Centre locations.

(xiii) Higher grade officials should be given short orientation courses in planning, extension and national policies at the Training Centres of the Central Government.

(xiv) To maintain high standard of technical efficiency of the personnel in executing field works, it is essential to provide them with approved technical standards and specifications for technical practices.

(xv) The service conditions of personnel should be improved to attract professional men to make soil conservation their career.

(xvi) In addition to reviewing the procedure adopted in some State, in giving the existing financial assistance of 25% for soil conservation works in agricultural land, provision should be made to compensate any initial loss in cultivator's income due to undertaking soil conservation works.

(xvii) Financial compensation should also be

up land-use-adjustments in critically eroded areas, especially in watersheds of river valley projects.

(xviii) For close co-ordination between state and Centre, the Central Extension Directorate under the Ministry should be the unified agency responsible at Centre's level for all Agricultural field programmes in the States.

(xix) Regional units of the Central Government should be organised by transforming regional organisations to render on-the-field technical assistance in formulating and executing the programmes. This will help the Centre participating in implementation of programme in States.

(xx) Under the leadership of the Centre, regional and national meets be organised for exchange of extension information, experience and knowledge gained in the field execution of programmes.

(xxi) States should strengthen their in-service training of staff as their responsibility.

(xxii) The job responsibility of staff should be defined to help specifying training needs and required staff training.

(xxiii) To prepare cultivators for the programme, the activities on extension education should be strengthened through result demonstration, organising training camps for village leaders and young farmers, mass media and visual aids. This will involve strong information units both at the

Centre and state levels.

(xxiv) Co-ordinated efforts on information and field publicity regarding agricultural programme need to be intensified by the information units of States and Centre.

(xxv) Programme research and evaluation need to be intensified on the Agricultural development plans and Agricultural Universities should also undertake them, under their wings of extension and agricultural economic divisions.

(xxvi) Case studies of successful farmers representing different income groups of land users need be undertaken to help suggesting actions on the soft areas of the programme.

(xxvii) There should be defined goals and procedure for a specific evaluation programme with provision for dependable data collection as grossly incorrect data are worse than no data.

(xxviii) In the administrative structure of programme planning and executions, intensive study of vertical relations and evaluation of flow of action programme through the structure will be significant in assisting programme administration.

Long term:-

(i) The Centre should be responsible for taking up national inventory of soil and water resources of the country to develop long term resource planning of the regions for maximising their utilisation.

(ii) Key village plans or farm plans should be

and 'in process' evaluation and for their use as Bench Marks while evaluating programmes in the area.

(iii) Special attention should be given to establish input-output relations while evaluating soil conservation measures as a part of agricultural production programme to assist formulating package of practices.

(iv) In the best interest of evaluation programme, the evaluation agencies should be associated, as far as possible, with programme planning and execution.

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5. APPENDIX & REFERENCES

APPENDIX I

Table 1

Catchment areas for different river valley projects in the country.*

S.No.	Name of Project	State	Total area of catchment in Square miles
(A) 1.	D.V.C.	Bihar & West Bengal	7000
2.	Bhakra		
(a)	Sultez	Punjab & H.P.	7440 (Punjab)
(b)	Beas	Punjab & H.P.	5470 (H.P.)
3.	Machkund	Orissa	290
		A.P.	568
4.	Hirakund	M.P.	28000
		Orissa	4570
5.	Chambal	Rajasthan	1005
		M.P.	7500
6.	Kosi	Nepal & Bihar	28852
7.	Mayurakshi	Bihar	718
8.	Kundah	Madras	728
9.	Pohru	J & K	718
10.	Tungabhadra	Mysore	10885
11.	Ram Ganga	U.P.	1210
12.	Dhantivada	Gujarat	1130
13.	Kangsabati	West Bengal	1463
14.	Chod	Maharashtra	1401
		Total	108958 or say 1,09,000

(B) Under construction

1.	Nagarjuna Sagar	A.P.	80000
2.	Candak	Bihar	15000
3.	Broach State (I Narmada)	Gujarat	33790
4.	Mahi (Stage II)	Gujarat	11840
5.	Ukai	Gujarat	23365
6.	Cirna	Maharashtra	1826
7.	Purna	Maharashtra	2830
8.	Tawa	M.P.	2310
9.	Rihand	U.P.	5148
10.	Metatila Dam	U.P.	8000
11.	Shetrunji	Gujarat	1667
		Total:	185776 or say 1,86,000
		Grand Total	2,95,000 sq. (1888.0 lakh acres)

* CWPC Note on Soil Conservation measures in River Valley catchments in connection with Fourth Five Year Plan.

Table 2

Showing extent of saline alkali and water-logged areas.*

S.No.	State	Area affected in lakh acres		
		Saline and alkali soils		Water logged area
		In land	Coastal	
1.	Punjab	30.0	-	25.13 (0-5' water table) 02.19 (5-10' ") 01.49 (10-15' ")
2.	U.P.	31.0	-	-
3.	Deccan Canal areas	30.0	-	-
4.	Maharashtra & Gujarat	-	60.00	0.55
5.	Kerala	-	0.35	-
6.	West Bengal	-	2.10	-
7.	Rajasthan	10.0	-	-
8.	Bihar	0.1	-	-
9.	Delhi	-	-	0.03
	Total	101.1	62.45	29.39

*Source:- Study on waste lands of India, including saline alkali, water logged lands and their reclamation measures by Committee on National Resources, Planning Commission.

Table 3

Showing First Five Year Plan achievements against total expenditure of 1.6 crores of Rs.

Sl. No.	Items of achievement	Category 'A' Schemes	Category
1.	Regional Research cum Demonstration Centres(Nos.)	8	-
2.	Central Arid Zone Research Institute(Nos.)	1	-
3.	Pilot Soil Conservation Demonstration Projects(Nos.)	-	11
4.	Personnel trained in Soil Conservation methods(Nos.)	250	-
5.	Planting of trees along the roads (Miles)	[illegible]	150
6.	Area under pasture improvement and experimental plantations (Sq. miles)	-	100
7.	Area covered under contour bunding and terracing (lakh acres)(Mostly in Madras & Maharashtra)	-	7.0

* Source:- Second Five Year Plan pp.306-307-GOI Planning Commission 1956.
* Category 'A' Schemes are Centrally executed and sponsored schemes for which Govt. of India bears the total expenditure.
* Category 'B' Schemes are State Plan Schemes-Expenditure borne by State with Central Assistance as subsidy or loans.

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Table 4

Showing the progress made and expenditure incurred during Second Five Year Plan.*

Expenditure incurred Crore Rupees	S.No.	Items	Category 'A' Schemes	Category 'B' Schemes
1.248	1.	Regional Research-cum Demonstration Centres (Nos.)	8	-
	2.	Central Arid Zone Research Institute (No.s)	1	-
	3.	Personnel trained in soil conservation methods (Nos.)	170 (officers)	-
			900 (Assistants)	-
0.418	4.	Soil and land use survey (lakh acres covered.	139	
0.181	5.	Pasture Development scheme	-	
0.114	6.	Dry Farming Demonstration (Nos.)	18	-
0.195	7.	Soil Conservation Pilot Demonstration in Bhakra Nangal-(Nos)	6	-
20.378	8.	State Soil Conservation works mostly bunding and terracing in agricultural land (Lakh acres).	-	24.73
	9.	State Afforestation and pasture Development works (area in lakh acres).	-	4.42 + 44½ miles (road side)
Total 22.478				

* Source:- Study of Soil Conservation Programme in cultivated land P.E.O. Planning Commission - 1962 GOI.

Table 5

Showing the Third Five Year Plan Programme, physical target and financial out lay.@

Third Plan outlay Rs.(crore)	Sl. No.	Items	Plan Target Category 'A'	Plan Target Category 'B'	Achievements 1961-63 Category 'A'	Achievements 1961-63 Category 'B'
0.50	1.	Regional Research cum demonstration (Nos).	2	-	1	-
0.02	2.	Personnel trained in soil conservation methods(Nos.)	350 (officers) 1700 (Asstts.)		*157 (officers) 611 (Asstts.)	
0.40	3.	(a) Central Arid Zone Research (nos.)	-	-	-	-
		(b) Extension Centre in Rajasthan (Pasture Dev.).	-	-	-	-
@Source:-		(1) Study of Soil Conservation Programme for Agricultural land P.E.O. Planning Commission-GOI-1962. (2) Interim report of working group on soil conservation, Ministry of Food and Agriculture, Govt. of India. *Figures upto end of 1963-64.				
0.25	4.	All India Soil and land use survey scheme (Lakh acres)	150	-	150	*745
11.00	5.	Soil Conservation works in the catchments of river valley projects(Lakh acres)	10	-	3.53	-
0.50	6.	Survey of ravines	-	-	-	-
0.28	7.	Dry farming Demonstration Projects (Nos.)	45	-	*43	-
	8.	State Schemes				
40.01	(a)	Contour bunding and terracing in Agri. land(lakh acres)	-	116.0	-	28.2
0.294	(b)	Dry farming (lakh acres)	-	220.0	-	29.9
7.097	(c)	Afforestation and pasture development (lakh acres)	-	6.3 (150 miles)	-	2.0
1.735	(d)	Ravine redamation(lakh acres)	-	0.30	-	0.04
5.640	(e)	Reclamation of saline and alkali soils (lakh acres)	-	2.00	-	0.2
1.664	(f)	Research and demonstration	-	-	-	-
1.159	(g)	Training	-	-	-	-
0.646	(h)	Survey (Lakh acres)	-	30.6	-	3.8
2.118	(i)	Miscellaneous (lakh acres)	-	0.90	-	-
60.363		Total				
73.313		and Total				

*Figures upto end of 1963-64

Table 6

Showing proposed Fourth Five Year Plan Programme Target and Outlays.*

S.NO.	Programme	Area to be covered (lakh acres)	Financial outlay (Rs. in crores)
1.	Soil and water conservation on watershed basis.	200.0	182.600
2.	Soil and land use survey	550.0	4.100
3.	Soil and water survey in watersheds of river valley projects.	25.0	51.000
4.	Pilot demonstration projects on watershed basis (300 projects)	2.5	2.400
5,	Stabilization of ravines and protection table land.	10.0	13.400
6.	Reclamation of saline alkaline and water-logged areas.	01.5	4.500
7.	Irrigation, water management and field drainage.	15.0	10.700
8.	Training and soil and water conservation research etc.	-	6.300
	Total:	254.00 (+survey for 550.0)	275.000

*Source- Approach to Agriculture Department in the Fourth Five Year Plan (Draft) 1964, Ministry of Food and Agriculture, Govt. of India.

Table 7

Showing soil conservation programmes and their likely coverage of area under projected Fifth Five Year Plan.*

S.No.	Particulars of programme	Total area likely to be covered (lakh acres)
1.	Soil Conservation on watershed basis	335
2.	Soil Conservation in the watershed of river valley projects.	60
3.	Stabilization of ravines and protection table lands.	24
4.	Reclamation of saline and alkali lands.	18
5.	Irrigation, field drainage and land forming	64
6.	Soil and land use survey.	650

* Draft Fourth Five Year Plan on Soil Conservation (Interim report of working group of soil conservation) Govt. of India, Ministry of Food and Agriculture pp. 56-57.

Table 8

Position of Soil Conservation Legislation in the various States.*

S.No.	State	Position of Soil Conservation Legislation
1.	Andhra Pradesh.	The Madras Land Improvement Schemes Act, 1949. The Hyderabad Land Improvement Act 1953. (An integrated Bill is under consideration).
2.	Assam	No legislation. However, Assam acquisition of land for flood control and prevention of Erosion Act, 1935.
3.	Bihar	No legislation but bill under consideration.
4.	Gujarat	The Bombay Land Improvement Schemes Act, 1942.
5.	Himachal Pradesh	Himachal Pradesh Land Development Act 1954.
6.	J & K	Land Preservation and Improvement Act.
7.	Kerala	Kerala Land Development Act No. 17 of 1964.
8.	Maharashtra	Bombay Land Improvement Schemes Act of 1942.
9.	Madhya Pradesh	Madhya Pradesh Land Improvement Act 1957.
10.	Madras	Madras Land Improvement Schemes Act 1959.
11.	Mysore	Mysore Land Improvement Schemes Act 1961.
12.	Orissa	No legislation yet but draft soil conservation bill has been introduced in State Legislation.
13.	Punjab	Punjab Land preservation Act 1900 with amendments in 1942, 1944, 1951 and 1958.
14.	Rajasthan	Rajasthan Land Improvement Schemes Bill under legislation.
15.	U.P.	Uttar Pradesh Soil Conservation Act, 1954.
16.	West Bengal	No legislation.
17.	Tripura	Under preparation.
18.	Andaman islands	Andaman and Nicobar islands Land Development Schemes Regulation, 1963.
19.	NEF.	None
20.	Pondichary	Madras Land Improvement Act 1959.
21.	Manipur	Madhya Pradesh Soil Conservation Act 1957
22.	Nagaland	Nil
23.	Goa, Diu and Daman	Nil.

*Source:- Study of Soil Conservation Programme for agricultur land by P.E.O., Planning Commission GOI-1962 and Interim report of working group on Soil Conservation forddraft of Fourth Five Year Plan, Ministry of Food and Agriculture, Govt. of India.

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Table 9

(a) Central Govt:-

Ministry of Food and Agri. (Deptt. of Agriculture)

Central Soil Conservation Board

Secretary: Soil Conservation Advisors. Dy. Advisors Asstt. Advisors.

Deputy Secretary

Deputy Secretary

Soil Conservation (Pl.) Sec. Deals with Category 'B' Schemes (State Schemes)

Soil Cons. (Instt.) Sec. Deals with Central Schemes and centrally sponsored schemes-category 'A' (9 regional research Centres, Training All India Soil and Land Use Survey River Valley Schemes).

(There is a special cell in CWPC, Ministry of Irrigation for soil Conservation in River Valley Projects.)

(b) State Govt:- Under the administrative control of the State Secretariate the following executives work for soil conservation schemes.

S.No.	State	State level	Division level	District/Sub Division level
1.	Andhra Pradesh	(a) Director Agriculture with Superintending Engineer.	Divisional Engineer -	Assistant Agri. Engineer.
		(b) Chief Conservator of Forests.	Conservator, Forests.	Divisional Forest Officer.
2.	Assam	Chief Conservator of forests, with Joint Director for Soil Conservation.	-	Divisional Officer.
3.	Bihar	Director of Soil Conservation in Forest Deptt. with Dy. Director, Soil Conservation in Agriculture Deptt.	-	Asstt. Director Soil Conservation.
4.	Gujarat	(a) Chief Conservator of Forests.	Conservator (Forests)- Kotar Affor-estation.	Divisional Forest Officer. (afforestation)
		(b) Director of Agri.	Divisional Soil Conservation Officer.	Soil Conservation Officer.

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5. J & K		Chief Conservator of Forests.	Conservator of Forests.	Divisional Forest Officer.
6. Maharashtra	(a)	Director of Agriculture with Joint Director Soil Conservation.	Divisional Soil Conservation Officer.	Sub-Divisional Soil Conservation Officer.
	(b)	Chief Conservator of Forests.	Conservator of Forests.	Div. Forest Officer.
7. Madhya Pradesh.	(a)	Director, Agriculture with Joint Director.	Divisional Soil Conservation Officer.	Soil Conservation Officer.
	(b)	Chief Conservator of Forests.	--	Dy. Conservator of Forests.
8. Madras	(a)	Director, Agriculture with Joint Director (Engineer).	Agriculture Engineers/ Divisional Engineers.	Asstt. Agriculture Engineer.
	(b)	Chief Conservator of Forests.	Conservator of Forests.	Divisional Forest Officer.
9. Mysore		Director of Agriculture.	Divisional Soil Conservation Officer.	Sub-Divisional Soil Conservation Officer.
10. Orissa	(a)	Director of Agriculture with a Joint Director (Soil Cons.)	Soil Conservation Officer.	Asstt. Soil Conservation Officer.
	(b)	Chief Conservator of Forests.	Conservator of Forests (afforestation).	Divisional Forest Officer.
11. Punjab	(a)	Director, Agriculture with a Joint Director (Soil Cons.)	Divisional Soil Conservation Officer.	Asstt. Soil Conservation Officer.
	(b)	Chief Conservator of Forests.	Conservator of Forests.	Divisional Forest Officer.
12. Rajasthan	(a)	Director, Agriculture with a Soil Conservation Officer.	Soil Conservation Engineers.	Asstt. Soil Conservation Officer.
13. U.P.	(a)	Director, Agriculture with Joint Director (Soil Cons.)	Dy. Director of Agriculture (Soil Cons.)	District Soil Conservation Officer
	(b)	Chief Conservator of Forests.	Conservator of Forests, (Afforestation & Land Dev.)	Divisional Forest Officer.
14. West Bengal	(a)	Director, Agriculture.	Dy. Director, Agriculture.	District Agriculture Officer.
	(b)	Chief Conservator of Forests.	Conservator of Forests.	Divisional Forest Officer.
15. H.P.	(a)	Director, Agriculture with Dy. Director Agr.	Divisional Soil Conservation Officer.	Sub-Divisional Soil Conservation Officer
	(b)	Chief Conservator of Forests.	Conservator of Forests.	Divisional Forest Officer.

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For Participants Only

AA II/5.

SEMINAR

ON

AGRICULTURAL ADMINISTRATION

(March 9-12, 1966)

IRRIGATION, FLOOD CONTROL AND DRAINAGE

by

D.B. Anand,
Member,
Central Water & Power Commission

INDIAN SCHOOL OF PUBLIC ADMINISTRATION
INDRAPRASTHA ESTATE
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IRRIGATION, FLOOD CONTROL AND DRAINAGE

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Irrigation is a vast and developing science. Water is the most important input for production of crops, and, therefore, the science of irrigation follows developments in the science of agriculture. Similarly, the technical aspects of irrigation works follow scientific developments in the engineering field.

This paper is an attempt to make available some useful information with regard to the irrigation sector in the present Plans. The paper also touches upon the subjects of flood control and drainage to the limited extent that they relate to irrigation.

Reference, wherever relevant, has been made to documents, published and unpublished, official and otherwise. The opinions expressed, and suggestions made, are entirely personal.

* * * * *

Introductory:

Irrigation is the controlled application of water to meet crop requirements left unsatisfied by rainfall, and is a fundamental need for agricultural production in areas where the rainfall is either scanty or is not suitably spaced in point of time during the growth of the crop. The irrigation engineer attempts to bring the water to the land through the distribution system according to the requirements and at the times needed for the growth and maturity of crops.

Irrigation has been practised by men for several millenia. Perhaps, the earliest irrigation started in Egypt on the river Nile, and there are indications of irrigation as early as 5,000 B.C. (1) There is evidence of a masonry dam having been constructed across the Nile in about the year 4,000 B.C. Irrigation in India is equally ancient, and from numerous references to tanks, dams and canals in old records, it would appear that artificial irrigation was practised in India at least as early as the fourth millenium B.C. (2) A notable example is the construction of the 'Grand Anicut' across the Cauvery in about the second century A.D., (2) which structure was re-modelled by the British during the 19th century.

The Surface Resources:

2. Irrigation in India depends mainly on the South-West Monsoon which comes during the month of June to September. There are some winter showers in some parts of the country by the North-East monsoon, but the main water resource is generated by the South-West Monsoon. In most parts of the country, therefore, there are heavy flow in the rivers during the months of June to September, whi

dwindle down to very low flows during the remaining period. The snow-fed rivers of the north, however, have almost perennial flows. The monsoon does not always bring constant rain either in quantity or in pattern. Therefore, in order to meet the requirements of crops which are grown all through the year it becomes necessary to harness the rivers and to store the flows during the monsoon period for utilization during the whole year.

The annual rainfall over the entire country totals to somewhat over 3,000 million acre feet, of which about one-third is lost by evaporation, and about 650 million acre feet seep into the soil, leaving about 1,350 million acre feet as river flows. Owing, however, to limitations of topography, flow characteristics, climate and soil conditions, etc., it is estimated that out of these flows only about 450 million acre feet can be usefully utilized for irrigation purposes.(3)

3. India embarked on planned economy in 1951. Although during the years after the Second World War some reconstruction schemes in irrigation were planned and taken up for construction a dynamic policy for irrigation can be said to have started only with the initiation of the First Plan in 1951.

Quite a number of irrigation schemes were in existence and operation before the start of the First Plan. The total water that was utilised by these pre-Plan Schemes was of the order of 76 million acre feet. The utilisation at the end of the Second Plan (1960-61) amounted to 120 million acre feet, i.e., 27 per cent, and at the end of the Third Plan, is expected to rise to 160 million acre feet, i.e., 36 per cent of the utilisable flows. (3)

This pace of utilization of the country's water resources is expected to continue during the future Plans.

The Plans:

4. Productivity was the critirion for sanction of irrigation schemes in the latter part of the nineteenth century, this meant that the net return should be more than a fixed percentage of the "sum at charge" within 10 years of the date of the completion of the Project. The Indian Irrigation Commission of 1903, however, suggested a different criterion: "In considering proposals for new irrigation works, the Commission will understand that greater importance may often be attached to the extent or reliability of the protection that will be afforded, than to the merits of the schemes regarded as financial investments." The Commission, accordingly, recommended a number of protective schemes, some of which were undertaken. Never-the-less, owing to World War I, and the consequent paucity of funds the emphasis continued to be on the productiveness of irrigation projects.(2)

In the planned economy of a country, however, it is necessary to develop all types of resources that may be available. Water is a very important resource, and, therefore, the stress now is to make the best use of this resource for various purposes, like irrigation, domestic water supply, industry, navigation, etc. Thus, the emphasis on "productiveness" has been considerably relaxed.

5. For planning purposes irrigation schemes have been divided into three categories, namely, major, medium and minor. Upto the year 1964, the Plan schemes costing upto Rs. 10 lakhs were called minor schemes; the ceiling has since been raised to Rs. 15 lakhs. Schemes costing

upto Rs. 5 crores are designated medium schemes, and those over Rs. 5 crores, as major schemes.

The sown area (1962-63) in the country is about 386 million acres gross. It has been assessed that the total possibility of irrigation coverage by major and medium schemes is about 112 million acres (assessed as 100 million acres in the formulation of the Third Plan), and about 75 million acres by minor schemes, i.e., a total of about 187 million acres by all types of irrigation. This obviously points to the need for great care in the proper utilization of the scarce water resource, so as to be able to serve as much area as possible, for the fast-growing population of the country.

During the First Plan 230 major and medium schemes were undertaken, of which 54 only could be completed. The expenditure during the First Plan amounted to Rs. 380 crores. During the Second Plan, the total number of continuing and new major and medium schemes was 351, of which 80 were completed, the expenditure being about Rs. 370 crores.(3) The Third Plan started with 271 schemes continuing from the earlier Plans and 95 new schemes were initiated, i.e., a total of 366 schemes have been under execution. The total expenditure during the Third Plan ending March 1966 is expected to be Rs. 564 crores. By the end of the Third Plan, 298 major and medium schemes are expected to be completed, and 202 would continue into the Fourth Plan. The achievement during the Fourth Plan would depend upon the allocation of funds, the final figure for which has yet to emerge.

Irrigation Potential

6. Of the total 112 million acres which could ultimately

were under command before the start of the First Plan. This potential rose to 30.3 million acres during the First Plan to 35.1 million acres at the end of the Second Plan, and it is expected to be about 42.7 million acres by the end of the Third Plan. When, however, all the schemes, accepted in the first three Plans are completed, it is expected that an additional potential of 44 million acres would have been created in over and above the pre-Plan potential of 24 million acres. Future irrigation planning would, therefore, need to cover the remaining irrigation potential of about 44 million acres; this would be the task during the Fourth and the subsequent Plans in the major-medium sector.

Minor Irrigation.

7. Minor irrigation, as the word implies, consists of small projects, which can be constructed quickly, and yield early benefits; this also covers works which can be constructed by the cultivators themselves at small cost. The minor works make use of surface water resources by small storage and diversion schemes, lift irrigation schemes, and of under-ground waters by dug and tube wells. This sector also covers other items, like water conservation, ground water re-charge and small drainage and flood protection schemes, etc. The financial limit for such schemes has been mentioned earlier.

Individually owned minor irrigation works are popular with the farmers in this country. The tube-wells are usually a more reliable form of minor irrigation. The small storages and dug wells depend upon local surface, re-charge, which is mainly from the monsoon, and, therefore, suffer from the drawback of lesser reliability when the monsoon fails.

Of the total potential of 75 million acres under minor irrigation, about 32 million acres had been covered

before the start of the First Plan. During the First Plan, a further net acreage of 4.5 million acres was added, which grew to 11.1 million acres at the end of the Second Plan, and is expected to rise to 17.8 million acres at the end of the Third Plan, thus making a total of about 49.8 million acres under minor irrigation at the end of the three Plans. This would leave a further potential of about 25 million acres to be created during the Fourth and future Plans.

Minor irrigation has an important role to play in the agricultural economy of the country, as the schemes can render service independently, and/or in conjunction with major-medium schemes, and as they can be constructed in short periods with small outlays. There is, therefore, considerable scope for accellerating the progress of minor schemes for local needs.

Sprinkler irrigation:

8. As the word implies, this type of irrigation means supply of water to crops by sprinkling, rather than by flow along the ground. This involves an over-head tank, pump (or a portable pump-trolley), pipes and sprinkling arrangements, which are expensive. This type of irrgation, however, has the advantage that water can reach even unlevelled land, and that the requirements of water are reduced, as the seepage losses are negligible.

The installation costs for a portable system work out to about Rs. 500 per acre, and the operating costs, including depreciation, to about Rs. 10 per acre-inch. It should, thus, be seen that, for ordinary crops, the system is expensive, and has not, therefore, yet found any significant acceptance in this country. The system, however, is being used in coffee and tea plantations, which can bear the

There is room for experimentation on this type of irrigation in various regions for various types of crops, like orchards, etc. Experiments would include water requirements for various crops, effects on soils and salt balance therein, economics, and possibility of complementary use with established irrigation systems.

9. Underground water resources are a major contributor to the acreage under minor irrigation. It is, therefore, necessary to assess the availability, extent, and optimum use of this resource. Some of the States have started surveys of underground water resources to enable more scientific planning.

The Exploratory Tube-wells Organization in the Union Ministry of Agriculture is, at present, the main organisation which undertakes scientific drillings and assessment of availabilities of underground water resources. Exploitation, however, is left to the State Governments, or private owners.

Flood control and drainage:

10. Large parts of the country are victims of ravaging floods in rivers during the monsoon. These floods wash away soil, deposit sand on cultivable land, and cause loss of life and property.

With the extensive construction of railways, roads, canals, etc., natural drainages have got blocked, or reduced in many cases. Further-more, cutting out forests and putting extensive areas under cultivation have reduced the flood absorption capacity of the land, thereby resulting in increased flows in natural drainages, as well as submergence of land where the drainages have been blocked.

The general types of work for flood control are detention dams, embanking of rivers and construction

renovation and re-grading, etc., of natural drainages. The D.V.C. dams, the embankments along the Brahmaputra, the Godavari, the Kosi and along other rivers in the country and the extensive construction of drains in the Punjab are examples of such control measures.

11. Lack of proper drainage of surface or sub-surface waters in irrigated land leads to a rise of the sub-soil water level and the deterioration of land resulting in very poor yields. The importance of adequate drainage in irrigated areas cannot be exaggerated and must be provided as soon as surface or sub-surface conditions indicate its necessity.

The States are alive to the importance of the measure and extensive programmes in the Punjab and elsewhere are topical examples of the work being done in this regard.

12. In the Second Plan flood control was a centrally sponsored programme. In the Third Plan, however, flood control, drainage and anti-water-logging schemes formed part of the State Plans.

The expenditure on flood control and drainage during the First Plan was Rs. 13.8 crores and during the Second Plan Rs. 49.1 crores. It is expected to be Rs. 85.0 crores during the Third Plan. Substantially increased allocations would be needed in the future Plans.

Project Planning:

13. Irrigation schemes up to the beginning of the century, were mainly diversion schemes on rivers. The flows, however, were not constant, wherefore such diversion schemes could not make use of the total water resources in the river basins. Also, such a set up was not very conducive to assured supply during the whole

patterns. Examples of such diversion schemes are found in all parts of the country.

In order to make optimum use of the water resources of river basins and to have assured supplies on planned crop patterns during the whole year, it became necessary to think of storage dams which would hold the heavy flows of the monsoon and release water throughout the year by regulated supplies for irrigation and other uses. A few such storage reservoirs were constructed after the First World War, amongst them being Bhatgar and Bhandardara in Maharashtra, and Mettur and Krishnarajasagar in Madras and Mysore. Rapid advances have since been made in soil mechanics and concrete and masonry construction, thus enabling the construction of higher dams, capable of storing more of the waters of the rivers. The present planning, therefore, is mainly based on storage dams with, where so required by the local terrain, downstream diversion weirs, for locating the cannal take-offs.

14. In many States, reconnaissance has been made in the past, and reports exist about probable areas and sites for irrigation schemes; master-plans for the development of water resources of river basins are also in hand in a number of States. The C.W. & P. C. has also carried out studies and compiled basin plans of probable utilizations for 23 river basins. These documents and toposheet studies indicate probable sites for development, which are confirmed by site investigations. Cropping patterns are devised, depending upon local conditions and the existing crops, in consultation with the local Agricultural Departments and proper water planning effected in the preparation of projects.

15. Irrigation is a State subject. Since the start of the Plans, however, the financial content of each Plan is assessed by the Planning Commission as also the overall Plan

for each State in consultation with the States concerned. As part of this planning process, the States do not undertake any major or medium projects, unless they have been accepted by the Planning Commission and the Government of India and included in a Five Year Plan. Central loan assistance is subject to such acceptance by the Centre.

All major and medium projects are prepared by the State Governments (sometimes, also, with the help of the C.W. & P.C.), and sent to the C.W. & P.C., for technical scrutiny, which broadly comprises the technical feasibility, designs and reasonable assessment of the cost estimates. Such scrutiny also tends to bring uniformity in criteria and designs. When so desired by a State projects are, in their entirely investigated, planned, designed and prepared by the C.W. & P.C. on the State's behalf and cost. After scrutiny by the C.W. & P.C., in conjunction and discussions with the States the project is placed before the Technical Advisory Committee of the Planning Commission, for approval before clearance by the Planning Commission. It is only after such clearance that the Plan allocations are made by the Planning Commission for individual projects.

Water availabilities:

16. As already mentioned the utilizable quantum of water will not be enough to economically serve all the cultivable land. There is, therefore, a competing demand for this scarce resource, the competition becoming keener where the rivers pass through more than one State. Such water demands usually lead to disputes and claims. Quite often, the States concerned come to mutual agreements regarding the distribution of waters of particular river basins. Some times, however, they are unable to do so; the question of distribution of Krishna and Godavari waters

In order to deal with such disputes Parliament passed the Inter-State Water Disputes Act, (1956) which provides for arbitration by a person to be nominated by the Chief Justice of India. It is, however, the usual experience that litigation in the matter of water disputes is a long-drawn-out affair, which holds up development. It is, therefore best in the long run for the parties to come together, and find solutions acceptable to all concerned with the help if necessary of a third party like the Union Ministry of Irrigation and Power. This is a method which the Ministry of Irrigation and Power advocates and tries to follow.

17. The experience of the U.S.A. in the solution of inter-State disputes regarding the sharing of waters among riparian states also confirms that the method of mutual agreement is preferable to litigation as will be seen from the following extracts from the forward to an official publication:(4)

> "The role that the Department of the Interior has played in the formulation of many of the perfected compacts (agreements). x x x x x x x Both in these cases and in many of the others where there was no Federal representation, or where the representative was chosen from another department of the Government, the Interior Department has been closely concerned with the negotiation of equitable and workable agreements and with their administration, has lent the services of members of its staff and contributed from its fund of information for these purposes, and has thus, it is hoped, been of material assistance to those charged with the formulation and administration of the documents."

> "Inter-State litigation and inter-State compacts (agreements) reflect, in essence, two different approaches - one that is usually a contentions approach, the other a cooperative approach - to the same problem. But either may give way to the other. x x x x x."

> "The Supreme Court has on occasions urged upon disputants the merits of seeking to solve their differences by agreement. For instance x x x x x, it said:

"The reason for judicial caution in adjudicating the relative rights of States in such cases is that, while we have jurisdiction of such disputes, they involve the interests of quasi-sovereigns, present complicated and delicate questions, and due to the possibility of future change of conditions, necessitate expert administration rather than judicial imposition of a hard and fast rule. Such controversies may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the Federal Constitution. We say of this case, as the court has said of inter-State differences of like nature, that such mutual accommodation and agreement should, if possible, be the medium of settlement, instead of invocation of our adjudicatory power."

18. There can be little doubt that in settling matters of water rights mutual agreement among the riparian State is the better method. For the optimum utilisation of river flows, it is necessary to make master-plans for complete river basins. Haphazard and isolated development can be wasteful and expensive. To deal with this problem, the River Boards Act, (1956) was passed by the Parliament. This Act provides for the setting up of River Boards for single or more river-basins. The Boards are meant to coordinate the activities of the concerned States, undertake investigations with regard to water availabilities and feasible project sites, and to draw up master plans for the development of river basins. It has not yet been possible to set up these Boards. According to the present thinking, however, it is proposed to set up an organisation in the C.W. & P.C. for regional planning by river-basins of the country. The organisation would function almost in the same manner as visualised in the River Boards Act but could be move easily and expeditiously set up thereby making possible an early start towards basin-wise planning.

19. The basic data needed for any kind of irrigation planning, is the quantum of river flows available. For this purpose, the State Governments have set up River

is to scientifically observe the river-flows throughout the year on a long-term basis. These observations form the basis of calculations of water availabilities. There is a further proposal of setting up over 200 key stations for observing river data under the purview of the C.W. & P.C. These stations will cover all the important rivers and important locations and will provide data which could be used by the States as an independent assessment.

It is essential that much key-stations are set up as soon as possible and that the data is published and provided to the States. It is also necessary that all the States regularly observe and publish data regarding rainfall and river flows. These organisations are basic and should be placed on a permanent footing, and not axed even in emergencies like the present. The cost of collection of such data is insignificant, when compared to the cost of projects and the benefits that accrue from the correct assessment of river flows and flood discharges.

Criteria for acceptance of Projects:

20. As mentioned in para 4 ante, the sanction of irrigation projects was subject to the productivity test in the last century. The acceptance of protective schemes was advocated early in this century but could not be universally implemented. On account of the fact that cheaper sites have been developed over the years, and due to rising costs, irrigation projects have become quite expensive. The usual capital cost of projects now amounts to about Rs. 400 to Rs. 1,000 per acre, and more. The existing rates of water charges for most crops cannot meet even the interest charges on these costs, much less the costs of maintenance and operation of the projects.

There has, therefore, been a persistent clamour for the review of the criteria for acceptance of projects.

The Planning Commission, therefore, appointed a Committee (5) for considering the criteria for appraising the feasibility of irrigation projects. Similarly, also, a Committee (6) was appointed by the Union Ministry of Irrigation headed by Shri Nijalingappa, Chief Minister of Mysore State and comprising Irrigation Ministers of a number of other States. The gist of recommendations of both these Committees is that the criteria for acceptance of the Irrigation projects needs a change, on account of the fact that irrigation not only helps the user but yields many other benefits, both direct and indirect. They have, therefore, suggested that a project should be considered acceptable if the direct benefits bear a certain ratio to its servicing costs. The Nijalingappa Committee has suggested that

> the "Economic benefit criterion should be adopted for sanctioning irrigation projects, instead of the present financial criterion. For this purpose, it will be necessary to lay down detailed instructions for working out the benefit-cost ratio."

The benefit-cost ratio is an important criterion which the Technical Advisory Committee of the Planning Commission takes into account while recommending projects for acceptance.

Financing:

21. The financial allocations are made by the Planning Commission after taking into account the resources of the States and adding there-to contributions as loans and grants. For accounting purposes the total expenditure on the projects are considered as loans on which interest and other charges have to be met. In this connection, it is interesting to note that this is not the method universally adopted. In the U.S.A., for example, the capital cost of the projects

is recovered in 40 to 50 equal instalments without any interest charges; and thus, the recovery is limited in time and extent. In Thailand, the Government finances the entire cost of irrigation projects from reserves or loans and operational charges from general revenues. The Government does not collect any water charge. In the Philippines no capital costs are recovered and the beneficiaries only pay for operation and maintenance.

In India no recovery is made for the capital cost but attempts are made to cover interest maintenance and operational charges through water rates and ancillary receipts. There is also a general policy of recovering betterment levy from the lands to be benefitted from the projects. The financial return is then calculated on the amount of the capital cost less the betterment levy. If the net financial return does not cover the interest charges the acceptability of the project is assessed on the benefit-cost ratio. In the present method of financing irrigation projects, interest charges start accumulating from the date of the sanction of the loan which means the date on which the construction of a project is started. These compounded interest charges become a heavy burden on the capital cost even before the project has started earning any revenue which tends to make the project unproductive. In view of the foregoing comments, there would appear to be a justification for review of the mode of financin of our irrigation projects. Some of the alternatives could be abolishing of interest giving moratorium for the accumulation of of interest, financing the total cost by Government, etc.

While on the one hand, there is need to review the criteria for financing of irrigation projects, there should be on the other hand, an equal stress on increasing the

production per acre from irrigated land. This would result in higher income to the cultivator, enabling him to bear a heavier charge per acre, and leading to higher revenues to Government from water rates and/or other levies on irrigated land.

Construction:

22. After the projects have been cleared by the Planning Commission, the construction is undertaken by the States, for which funds are obtained by annual allocations after discussion of the annual plans with the Planning Commission. The construction agency depends upon the magnitude and annual financing pattern of the project. In projects of large size, extensive coverage and heavy cost, it is usual to have specific administrative machinery, which may be at the level of a SuperintendingEngineer, or a Chief Engineer, with supporting staff. The examples of Nagarjunasagar, Koyana, Ukai, Ganganga and Rajasthan Canal could be quoted, where Chief Engineers have been appointed for the execution of the Projects. In smaller projects, a superintending Engineer, or even a lower charge would do. Such specific administrative set up helps in coordinated and expeditious work and is to be welcomed.

23. It is now almost the universal practice to appoint Financial Advisers and Accounts Officers on big projects so as to help relieve technical officers of a lot of accounts routine. It is also the usual practice to constitute Control Boards for such big projects, in order to watch the progress and to expedite decisions towards speedy execution. In the case of uni-State projects, the Control Board is usually presided over by a Minister from the State. In the case of multi-State projects, the Chairman could either be the Governor of a State, or the Union Minister for Irrigation and Power.

The Koyna and Ukai are examples of uni-State, and the Balimela, Beas and Chambal are examples of multi-State projects. These Control Boards meet about 4 to 8 times a year, to transact business. The Control Board consist of the State Ministers in charge of Finance, and Irrigation and Power Departments, the Chief Engineer concerned and representatives of the Finance and the Irrigation & Power Ministries from the Centre, with representatives of other concerned interests.

24. For speedy construction assurance of funds, construction materials, construction equipment and trained personnel are essential. The main bottle-neck being experienced at the moment is the lack of foreign exchange for procure heavy construction equipment. For example, the demand for foreign exchange required for irrigation and multi-purpose projects during the Third Plan, amounts to Rs. 73 crores, against which the total allocation upto 31.3.1965, was Rs. 33 crores. Such a shortfall would result in slowing down of progress on projects.

The Union Ministry of Irrigation and Power has recently finalised a scheme for creating a Central Equipment Pool for which bulk foreign exchange may be forthcoming from some foreign-aid agency. The equipment will be controlled by the Ministry, and loaned to the States/Projects on hire.

25. In certain States there is a shortage of technical personnel in varying degrees at the higher levels, but more uniformily at the lower levels especially of overseers. The shortage of mechanical staff and operators of equipment is very common. In this connection, the C.W. & P.C. runs four Training Centres for earthmoving equipment, distributed over the various regions of the country. These have proved

extremely helpful in training of operators/mechanics who have been very usefully employed on the construction of projects. Such a programme should not only be continued but intensified.

The emoluments of the construction staff, including the Supervisory Staff, have not kept pace with their utility and responsibility. This subject is discussed in various Control Boards from time to time, and some remedial steps are being taken, but the shortage still persists, as the steps are either long delayed in acceptance and implementation, or are not enough.

26. The availability of controlled materials like cement and steel is another very serious bottle-neck which affects the progress of projects. Even though designs are made to reduce the requirements, it has still not been always possible to meet the needs fully. For example, against a total demand of 25,000 tonnes of controlled categories of steel during the year 1964-65, only about 6,000 tonnes could be allocated to irrigation and multi-purpose projects. Similarly, against a demand of 26 lakh tonnes, only about 16 lakh tonnes could be allocated to irrigation and multi-purpose projects. In the matter of steel there are again shortages in some specified and important categories and very often substitutes are difficult, or not possible. While such shortages are likely to persist in a developing economy it seems necessary to find means for meeting the demands of vital irrigation and multi-purpose projects.

Project priorities:-

27. A very large number of major-medium projects have been undertaken in the country. The total cost of projects, included in the first three Plans is estimated at about Rs.2,300

Plans ending March, 1966, is expected to be of the order of Rs. 1,325 crores, thus leaving a balance of about Rs. 975 crores, to be spend during the Fourth and future Plans on the works that will spill over from these projects. Out of the major-medium projects accepted during the three Plans 298 are expected to be completed by the end of the Third Plan, resulting in 202 projects continuing into the Fourth and future Plans. Of these continuing schemes, it is expected that 178 would be completed during the Fourth Plan and 24 will continue into the Fifth Plan. The schemes spilling over beyond the Fourth Plan are such as are of large physical extent and need long time in construction. Attempts are being made to complete as many schemes as possible in the early part of the Fourth Plan so as to achieve added food production.

28. Some of the significant reasons why the schemes take so long in execution are rise in prices, insufficiency of initial investigations, change in scope, revision of estimates and low annual allocations. It is necessary to consider suitable measures to assure more reasonable investigations and finalisation of schemes and earmarking of funds and equipment for schemes in such a way as to assure completion at the optimum rate. This would also imply limiting the number of schemes under construction at any one time to within the availabilities of the various components like finance, foreign exchange, trained personnel and key-materials. At the present moment there is a tendency to undertake more schemes than could, perhaps, be completed at the optimum pace of availabilities. This thin-spreading of the resources leads to longer periods of construction, with consequential higher costs in supervisory establishment and progressively increasing prices.

The best way to construct a large number of schemes would be to construct them in small batches, which can be completed quickly one after the other. Another suggestion would be to earmark funds, especially for the important schemes, so that their progress is not hampered by transfer of funds elsewhere. It would also help if allocations are guaranteed for the total period of construction, or, a plan-period, rather than by annual driblets which militate against optimum and efficient construction programmes.

Water to the field:

29. The irrigation supplies from the Government Projects are made available from pucca outlets constructed by the Government on the distribution channels, like distributaries, minors and sub-minors; direct outlets from major canals and branch canals are also sometimes given. The commands of the outlets are usually fixed between natural sub-drainages, so that the main water course may be constructed on the ridge-line and field channels away from the water course, thus facilitating easy command. The Planning Commission has advised the States that the command of the outlets should be so fixed that the discharges are limited to between 1-3 cusecs, which means serving between 100 to 300 acres on each outlet. Further considerations in the fixing of outlet commands are that the length of the main channel should not be so long as to result in a lot of seepage loss, and that the number of users on each outlet should be reasonable to facilitate distribution of water.

30. The construction of the water courses and field channels is the responsibility of the beneficiaries, but the Irrigation Departments are expected to align the main water course and to advise the irrigators thereof. The responsibility for execution of the water course and

field channels has, in certain cases, been laid on Panchayat and Zila Parishad organizations. The Irrigation Acts usually provide for the excavation of these channels in case of recalcitrant irrigators, at the cost of the beneficiaries. Certain powers have also been given to the Panchayats in this behalf. The maintenance of the water courses and field channels has to be carried out by the irrigators concerned.

31. Before an irrigation project is considered complete the construction of the outlets (permanent, or temporary) has to be assured. Enough progress has not, however, been achieved in the construction of water courses and field channels in a number of projects. This, amongst other reasons, is due to lack of cooperation amongst the irrigators, lack of finance, obstructions to land going under the channels, and absentee landlords. Even where the channels have been constructed, they are not always upto requirements, thus resulting in breaches and in-sufficiency of water. In the States where irrigation is an established practice, there is less difficulty in this regard. It is, however, necessary that there should be a proper drive for the completion of the water courses and field channels, concurrently with the completion of the distribution system and outlets in irrigation projects.

32. Opinions have been expressed that water courses and field channels upto, perhaps, 25-acre block, may be constructed at Government cost, recoverable from the beneficiaries. This would raise the question of land acquisition, ownership and future maintenance; besides if this is done the irrigators would not feel enough interest in this very vital link in the water conveyor system. Furthermore, with the stress on cooperation, and the coming in of local

Panchayats and similar organisations, it will appear to be a retrograde step for the Government to take over this particular item. This would also need a very large technical staff, which is not available and higher costs. It has also been the experience that wherever water course and field channels have been so constructed, it has not been always possible to recover the cost from the irrigators.

33. The proper end use of water on the field connotes the success of an irrigation scheme. All possible attempts are, therefore, made to assure conditions for proper utilisation of supplies and this needs action by various departments.

In order to assure speedy utilisation after creation of potential the Planning Commission has suggested Area Programmes for the field, which embrace coordinated action by all the concerned departments, and covers items like alignment and excavation of field channels, soil surveys, tractorisation and leveling of land, demonstration farms/plots, fertilisers and improved seeds, marketing facilities, consolidation of holdings, etc. (7)

Quantum of Water:

34. As already mentioned, the utilisable water resources fall short of the land availabilities. In most river basins, therefore, it would not be possible to cover all the land with irrigation. On the other hand, there is a large rural population dependent on the land for livelihood and it is desirable to provide them facilities for improving their living conditions, even though the full demands cannot be satisfied. In the design of irrigation projects, therefore, consideration has to be given as to how to serve the maximum area to the advantage of the maximum numbers, with the available water

areas have also to be given due weightage. It is, therefore, that the intensities of irrigation on the projects are usually less than 100 percent, which means that every acre in the command does not get water every year. It would, of course, be economical to aim at higher intensities, which could result in shorter lengths of canals, and lesser maintenance and operational expenditure; but this would result in service to lesser number of people and smaller areas.

The water dosages for crops are fixed on the advice of the local Agricultural Departments and on previous experience. The advent of chemical fertilizers, etc., in the last few years has changed the situation, thus calling for change in the traditional lines of irrigated agriculture.

To make the best use of available knowledge, and inputs, it is, therefore, necessary to carry out research, and experiments correlating production with varying combinations of inputs for varying crops, climates, and, soils in the country. Decisions regarding frequency and quantum of water dosages could be based on the results so obtained in such a way as to utilise the available water resources for the optimum benefit of the largest area. I the context of scarcity of the water resource, the stress should be on the maximum production per unit of water, rather than per unit of land, accepting of course, a minimum norm for per acre productior

Water Management:

35. Irrigation has grown in various forms in the country. In predominantly paddy states, for example, irrigation water is used from field to field, while in most areas, proper water courses and field channels are constructed for a more scientific use of water. It will be realised that field-to-field irrigation is wasteful, as it leads to a large amount of soakage and evaporation losses, washing away of fertilisers, and hardly

much control on the quantity of water utilised. Also such a system militates against a second crop, other than paddy, for which areas are scattered and field-to-field irrigation is not possible. Attempts are being made to pursuade all States to insist on proper courses and field channels for water distribution.

36. Irrigation channels are designed on the basis of planned crop patterns and expected requirements of water dosages. If water users do not practise economy in water use the planned acreage cannot be achieved.

Water supplies are given in various ways. For example, in certain States in the north, a fixed quantity of water is allowed per thousand acres of command. In certain other States, water is allowed on application by sanctioning acreages for each season. In certain States water is let into the channels to satisfy the demands of the users without any control on the quantum of water so supplied.

37. The best method would, of course, be to sell water by volume, in which case the user will pay for the quantum of water received and will use it as he desires. It has, however, to be realised that the net return from the same quantity of water use is not the same for every crop, and, therefore, the user could not afford to pay a constant price. Again, the number of users on our channels is large on account of small holdings which makes it impossible to effect individual measurements of su plies. It is also impracticable to obtain, instal and, maintain such a colossal number of measuring devices, which would involve heavy expenditure, as well, as loss in commands on account of the differential water levels required by every measuring device. For

volume has not been found practicable.

In order to induce the economic use of water it is advisable to supply water on what may be called, "measured basis". This would connote that design requirements for the actual crops grown on each outlet, should be calculated, and the distribution system at the outlets run in each rotation for such periods as would supply the designed requirements. There should, however, be a constant review of the designed requirements in research stations and the field so that the theoretical water requirements are as near the actual needs as practicable.

38. Further measures are also needed to conserve water for optimum advantage. It is necessary, for example, to check the misuse and wastage of water. This can be done by imposing penalties on such wastage and misuse. This is current in a number of States, but the rules are not always applied; there is room for tightening up. Since the calculation of needs and supply of water are the primary responsibility of the Irrigation Departments the control of misuse and mismanagement should also be within their purview so that they could keep a proper water account, and match supplies with requirements.

39. Almost 40 to 50% of the water let into the canals is lost by evaporation and seepage before it reaches the field. Lining of channels by concrete, masonry, tiles, etc. would reduce the losses by about 66% but lining is expremely expensive and not always economically feasible in the content of our financial resources. Lining is, therefore, usually resorted to in locations where soils are pervious and where justified by other strong reasons like scarcity of supplies, nearness to urban areas, etc. Lining of the entire Rajasthan Main Canal is an example.

A substantial water loss takes place in the water courses and field channels. Significant savings could be effected if these could be lined with some cheap materials by the users. Experiments for cheap linings have been in progress, specially in the U.P.; no universal cheap form of lining has yet been found.

Irrigated Agriculture:

40. With the extensive irrigation programme undertaken in the country a large number of irrigation projects are being constructed in areas where the farmers are accustomed only to dry or rain-fed, farming. The continuous supply of water changes the whole aspect of agriculture as it brings in new crop-patterns, double and triple cropping, improved seeds, fertilizers, pesticides and other scientific practices. There is, therefore, need to study the use of all these inputs for various crops in the different regions of the country and to disseminate this information among the farmers through extension agencies.

This is usually done by opening regional research stations, research-cum-demonstration farms, and demonstration plots on the cultivators' fields. Experiments as well as intensive propaganda are necessary.

It is also to be realised that irrigation systems can work only to certain regimes, like rotational periods on which the canals have to be designed and constructed, and water supplies made and assured to all users. Agricultural research, therefore, has to take these regimes into account and to advise the farmers accordingly. There is no doubt that proper coordination is necessary, and the most practical regimes should be evolved taking into account the requirements of agriculture and reasonable regimes for water supplies

in the interest of economy and optimum benefit.

41. It is necessary that research stations, demonstration farms and demonstration plots should be distributed all over the project areas so as to cover various soil-climate complexes. This is already being done to some extent and extensions are being planned.

For achieving maximum benefits, however, it is felt that in each State a high-placed Agricultural Officer with supporting staff is made responsible for research and development of irrigated agriculture within the commands of irrigation project. For effective control and utilisation, the planning and budgeting of irrigated agriculture should be distinct from those of the general Agriculture Department. It is desirable to attach such agricultural staff to the Irrigation Departments of the States for carrying out the necessary research and propaganda and to attend to matters like levelling of land, seed multiplication, supply of fertilisers, seeds, pesticides, demonstrations and propaganda, etc., within the command of the projects. In other words, the special agricultural staff in Irrigation Departments would help to progress the area programmes suggested by the Planning Commission. The Nijalingappa Committee (6) has, in this regard, recommended:-

> "A senior and experienced officer of the Agriculture Department, with adequate supporting staff, should be attached to the State Irrigation Department, to advise on agricultural aspects of major and medium irrigation projects, such as cropping pattern, water requirements of various crops, suitability of areas for irrigation, both for new and existing projects".

42. Sustained progress in irrigated (and, unirrigated), agriculture needs constant watch, review, and coordination at various levels. This is attempted by the formation of Boards and Committees, a number of which have already been

formed. The following advice by the Planning Commission(7) in this regard, is relevant:-

> "It is considered that with the provision of adequate funds in the annual plans of the States for the activities of all the Departments concerned, the implementation of the area development programme should not present any major difficulty. As regard the administrative and organisation measures necessary for proper coordination, Irrigation Development Committees consisting of representatives of the respective Departments, have already been set up at the State level. These Committees should include the Director of Agriculture and Head of other Departments concerned. Similarly, the Chief Engineer should be represented on the State Agricultural Production Committee at the official level. At the District level, the Agricultural Production Committee of the Zila Parishads should have representative of the Irrigation Department and other Departments concerned. There should also be similar agricultural Production Committees at the Block level. In the case of large projects where there are projects, all the concerned Departments should be represented on them. For effective coordination, it is important that the various programmes of the different departments in these project areas should be assigned to one single officer of appropriate status at the State level."

/responsibility for the implementation of the

Water charges.

43. As mentioned above, the present-day practice in almost all the States is to charge for water in the form of water-rates. These water rates are based on the type of crop and are usually charged on acreage basis in various forms, e.g., specific water rate, consolidated assessment, rate on Agreement, etc. With the rising prices, the costs of projects have risen appreciably. In general, the capital cost per acre of supplying irrigation water varies from Rs. 400 to Rs. 1,000 and over per acre. It is evident that no dry crop can bear the servicing charges of such costs. The new irrigation projects would not, by and large, pay for themselves on a commercial basis. It is, therefore, that the benefit-cost ratio concept for the acceptance of projects has gained ground.

On the other hand, it is noticed that the water charges have not kept pace with rising incomes from irrigated agriculture. While it is accepted that irrigation projects cannot pay their way on the basis of water rates, it is necessary that these should be periodically revised, so that the Government gets a reasonable share of the increased income of the users of irrigation facilities. Also in order that Government may share in the owner-ship gains which accrue to the farmers on the advent of irrigation projects a certain levy should be made towards the capital cost of the project. The recommendations made by Nijalingappa Committee in this regard, are given below: (6)

"RIVISION OF WATER RATES.

Water rates should be on the basis of a suitable percentage of the additional net benefit to the farmer from an irrigated crop where with the available data, this can be worked out. These rates may be fixed at 25% to 40% of the additional net benefit, keeping in view factors, like rainfall, water requirement, yield and value of crop, etc. Where it is not feasible to work out the additional net benefit water rates may be fixed, to start with, as a suitable percentage of gross income to the farmer from the irrigated crop. Rates in this case may be 5 to 12 percent of the gross income.

Water rates should be reviewed every 5 years. Required data regarding additional net benefit should be continuously collected for this purpose.

INTRODUCTION OF IRRIGATION FACILITY CHARGE.

In States where irrigation charges are optional, in consideration of the Irrigation facilities, having been made available for an area, there should be a 'charge' to cover at least the maintenance and operation charges, whether the facility is actually made use of, or not.

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On carrying out actual irrigation, this facility charge paid in respect of the area, should be deducted from the total irrigation dues for the year, i.e., it will form part of the water rate."

RECOVERY OF BETTERMENT OR CAPITAL LEVY.

A betterment or capital levy should be charged on irrigation projects, the quantum and mode of recovery being determined by the State Governments"

Irrigation projects are financed from public funds. Individual users are greatly benefited by them and it is but fair that they should contribute to the community a reasonable share of the gains. While, therefore, irrigation projects may be accepted on the basis of the overall benefit to the community, it is necessary that the revenues therefrom must be optimised by the Government taking a reasonable share of the benefits accruing to the users. Without optimising such returns it would not be possible to undertake such projects on a continuing basis.

Augmentation of irrigation facilities:

44. As the surface water resources cannot meet the full demand in the command it is necessary to augment supplies, wherever possible. This is possible in certain locations, from underground water sources.

It is, however, necessary that a judicious investigation should be made in irrigation commands of deep underground water reservoirs as well as where the sub-soil water-table tends to approach the ground level. These underground supplies could then be tapped by shallow wells or deep tube-wells and the water used to supplement the surface availabilities. Commonly at present dug-wells and tubewells are being constructed by private owners and the Government. In the U.P. and the Punjab a large number of Government-owned tube-wells are in operation.

45. Private wells and tube-wells within canal commands have presented management problems, as there is a tendency on the part of cultivators to mix canal and well supplies to the detriment of Government revenues and leading to a reduction of

The best course is to consider all the surface and deep sub-surface (i.e., tube-well) supplies within canal commands, as Government property and for the Government to integrate the two and development an integrated system. In such an integrated system, the water rates could be uniform, irrespective of where the supplies come from, and the control retained by Government, thus obviating chances of misuse and difficulties. The dug wells will have to remain private property but some kind of control over their capacities and number would help in the scientific use of the underground water resources.

46. In the present context of shortage of food there are other possibilities of schemes which can be quickly executed and harnessed. For example, lift schemes can be undertaken on rivers with available flows, lakes, drainage channels and the like. The usual difficulty in such cases is the heavy operational costs which the owners and even the State Governments find hard to meet. It is only on cash crops like sugarcane, that such schemes can pay. The Central Government has, however, advised the States to consider the possibilities of such schemes on a crash-programme basis in order to help production of more food. Such schemes would need pumps, pipes, electricity (diesel pumps are much more expensive to operate), transmission lines, water channels, etc., which are not available in all locations. Their operational costs range from Rs. 25/- to Rs. 100/- per acre or more.

The schemes would mainly be owned by individuals who would find the capital and servicing charges a very heavy burden specially if only food crops are grown. The burden would be heavy even for the State, if they were to finance, and maintain such schemes. In their very nature, therefore, such

schemes would be for a temporary period, except, where the owners instal them for the more paying crops on a permanent basis.

Conclusion:

47. Indian agriculture, by and large, is still traditional. The recurring food crisis, however have led to a stress on modernisation of agricultural practices. Irrigation is the primary output in modern agriculture, and its aim would continue to be to supply water to crops, as and when needed. Thus, improvements to the present practices and procedures are called for in order to make this service more exact and efficient. The possibilities have been indicated at relevant places in the paper; the important ones are summed up below:-

(i) Hydrology forms the very basis for scientific development of water resources. It is, therefore, necessary to streamline the arrangements for hydrological observations, like rainfall, river flows and floods.

It is advisable to establish the necessary number of key stations, which should be set up and maintained by the Centre, to collect and make available the requisite data at important points and to act as a check on the observations at the stations maintained by the States, which would be much larger in number.

The organisations in this behalf should be permanent and not retrenched or reduced, even under the most difficult financial situations.

(ii) The irrigation projects must be as economical possible. For this purpose, sufficient investigations are needed. There should be a permanent set-

investigations, planning and design of irrigation projects. Enough funds should be provided and sufficient time allowed for such investigations.

Time, money and effort spent on proper and detailed investigations will lead to more realistic estimates of possibilities, construction schedules and financial costs.

(iii) The control of supply, regulation and use of water should be functional and within the purview of Irrigation Department. This would entail complete control of the supply of water at the outlet to the cultivators, the use or misuse and wastage of water, the measurement and demand assessments for crops and other similar factors.

(iv) It would be advisable to consider the surface and sub-surface water resources within canal commands as within the purview of the Irrigation Departments the development of which should be its responsibility.

(v) For optimum use of water resources, basin-wise planning becomes a must. It is also necessary to devise machinery for the quick disposal of water disputes and the allocation of waters of inter-State rivers.

(vi) The number of projects under construction at any one time in any State should be related to the amount of allocable finances and the policy should be to complete projects in batches rather than to spread thinly the available finances.

Where benefits can be achieved by splitting a project to be completed in stages, it should be done.

(vii) Funds are important projects should be earmarked on a long-term basis, say, for a whole Plan, rather than by annual allocations. Priority should also be given in the allotment of foreign exchange and supplies of key-materials for such important projects.

(viii) The benefit-cost ratio criterion, should be adopted for acceptance of projects. All the same however, it is necessary to optimise Government revenues from the projects by way of betterment levy and periodically reviewing and increasing the water rates in such a way as to ensure the Government getting a reasonable share of the income to the cultivator from the crops raised.

(ix) Irrigated agriculture should be considered as an integrated whole. For this purpose, it is necessary to attach/appoint high-level Agricultural officers with supporting staff in Irrigation Departments of States for the "progressing" and agriculture in irrigated areas.

(x) Continuous experiments are necessary for ascertaining water requirements of crops in different soil-climate complexes and with various inputs so as to obtain optimum agricultural production per unit of water; and

(xi) Demonstration and propaganda through efficient extension agency are necessary follow-ups for taking agricultural science to the field.

For Participants Only

AA.II/6.

SEMINAR
ON
AGRICULTURAL ADMINISTRATION
(March 9-12, 1966).

AGRICULTURAL CREDIT IN INDIA

By

S.K. Datta
Special Secretary
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AGRICULTURAL CREDIT IN INDIA

INTRODUCTION:

In traditional Indian agriculture, which is primarily of a subsistence nature, cash investment by cultivators in current needs of agriculture as well as in items of a more permanent nature has been negligible. Hence the requirement for credit for production purposes has been low compared to the importance of agriculture in the economy of the country. The Indian farmer, however, has been traditionally in debt, the bulk of the debts being incurred for purposes of consumption or meeting social and religious obligations. The All India Rural Debt and Investment Survey 1961-62 reveals that total borrowings of cultivating households in the country in that year were of the order of Rs. 1034 crores. Out of this only 22.1% was for capital investment in farm business and 13.5% for current expenditure in agriculture. The picture, however, is changing fairly fast and the demand for credit for productive purposes is rising.

One of the problems of agricultural credit in India is the lack of credit-worthiness of the bulk of the cultivators looked at from the point of view of the provider of credit - be it an institutional agency or a private money-lender. The farmer's only asset is land. Nearly 63% of the cultivating households have holdings of five acres or less. Out of them the percentage of cultivators holding one acre or less is more than 19%. Many of those, who cultivate larger holdings considered to be economic, do not necessarily own the land being tenants or share-croppers on oral arrangements with no right over the land.

Another important factor enhancing the risks of agricultural credit and raising its costs, when advanced by private agencies, is the nature of Indian agriculture which is dependent on the uncertain monsoons. The unprecedented drought extending over six

during the three Five Year Plan periods. The massive programme of irrigation taken up since independence has not yet been able to assure water supply to more than one fifth of the total cultivated area. Along with the vagaries of nature, there have been wide fluctuations of prices from season to season or year to year adversely affecting the repayment capacity and thereby the credit worthiness of the cultivators.

Lastly, there is the factor of the farmer's attitude and psychology which must change. The farmer must appreciate that agriculture is not merely for providing a sustenance but it can be a profitable venture if his borrowings are production-oriented, resulting in higher income and not weighted towards consumption needs.

In sum, the problem of agricultural credit in India is not merely one of providing funds necessary for the purpose and setting up the institutions to disburse them, although these are basic. It is part of a larger problem of the economic rehabilitation and reconstruction of agriculture in the country.

2. VARIETIES OF CREDIT USERS AND CREDIT NEEDS:

Cultivators may be classified into different categories according to the nature of crops grown which govern their needs of credit from the point of view of the quantum as well as the period for which credit is needed. The purposes also would vary in detail for different crops. For instance, the credit needs of cultivators of plantation crops and orchards are very high. Heavy initial investment as well as a period of waiting are involved. For other commercialised but seasonal crops like jute, sugarcane, cotton and oilseeds, the initial investment as well as the period of waiting are less and the needs of those cultivators are not markedly different from growers of foodgrains.

Credit is required by the farmer for the purposes of production, marketing and any processing that may be needed before

marketing as well as for essential consumption needs. Credit is classified as short term, medium or long term from the point of view of period of repayment; one year to eighteen months for short term, 3-5 years for medium term, and 5-15 years for long term. From the point of view of requirements, the same classification may be used. Short term credit is needed for current or seasonal requirements, which can be paid back, once a successful crop is raised and marketed. The cash expenditure, traditionally incurred by cultivators for which short term credit is needed, are as follows:

> Cash wages for labour engaged casually or on an annual basis, seeds, manures, purchase of fodder and miscellaneous other materials, maintenance and repair of implements, hire of bullocks etc., payment of land revenues or irrigation charges, cash rents and interest.

For improved agriculture should be added the cost of improved seeds, chemical fertilisers, pesticides, fuel or electricity for mechanised equipment, its repair charges etc.

The true categorisation of medium term credit would be for replacement of or minor additions to capital equipment e.g. bullocks, relatively inexpensive implements and machinery and spare parts etc. Items of investment proper, as in reclamation, or improvement of land, sinking of wells, purchase of tractors and other machinery, pumpsets etc., should be financed by long term credit. In actual practice, however, medium and long term credit overlap. Loans for items of investment involving comparatively less expenditure, which may be repaid within three to five years, can be advanced out of medium term loans. Due to the inadequacies of the credit structure, often loans for investment purposes which should be of a long term nature and repayable over a period of years, are advanced as medium term loans resulting in the cultivators defaulting in the

and once the sale proceeds of the crops are received, the advance may be paid back; similarly for processing also, except for the purchase of processing equipment which has to be financed through medium or long term loans. The credit for consumption can be of short or long term nature according to the purpose for which the loan is taken and the size of the loan. Loans for meeting day-to-day cash expenditure while the crops are in the field can be financed by short term loans, but loans for purchase of land, construction or repair of houses, repayment of old debt, expenditure on marriages and funeral ceremonies, litigation etc. would involve the cultivator in long term debt. While the cash expenditure necessary for production, incurred seasonally or over a period of years, gives rise to the need for credit, the need, however, varies as between different classes of cultivators. The well-to-do farmer can meet his short term needs and possibly a good portion of medium or long term needs from his own resources whereas the less well placed cultivator would certainly need credit for his entire long term investment and possibly a good portion of short term needs also. The real problem is constituted by the marginal and sub-marginal cultivator who constitute the largest number are caught in a vicious circle. Even when he is convinced of the need for larger investment, he cannot raise credit. Without the investment his income and assets cannot rise and he cannot become credit-worthy.

While the short term loans are often on personal security, medium and long term loans, are usually secured by a mortgage on the land of the cultivator. It has been stated earlier that many tenants and share-croppers are not in a position to mortgage their holdings. For machinery and equipment, if sold on hire purchase terms, a mortgage of the land would not be necessary, but these facilities are not yet available to the cultivator. Even short term loans advanced by the private money-lenders, who constitute the largest source of credit to cultivating

households, may be secured by a mortgage of the land unless there is gold or silver to pledge and a great deal of alientation of agricultural land takes place because of the cultivator's inability to repay the loan which from short term becomes very long term indeed.

It has already been noted that agricultural prices fluctuate widely from year to year or crop season to crop season enhancing the risk to credit when prices drop. In the interest of a healthy credit structure and for that matter, healthy agriculture in India, it is very necessary that there should be a scientific price support policy for all agricultural crops, particularly the major food-grains and crops on which our industry and export earnings depend. Remunerative prices should be fixed preferably for two or three seasons in advance and declared sufficiently before the harvest, so that the growers are in no uncertainty and would not part with their grains at low prices to traders and middlemen. It obviously follows, that there should be marketing or procurement organization throughout the country, to implement the price support policy. To safu-guard the farmer against the vagaries of nature or destruction by pests and diseases, it is also necessary to introduce a national scheme of Crop Insurance. In periods of drought or floods or widespread destruction of crops by pests and diseases the cultivators invariably default in repaying loans which renders them ineligible for fresh credit and clogs the entire system. In addition to price support and crop insurance, it is necessary to build into the credit structure itself a stablization fund to convert short term loans into medium term and avoid the cultivator being declared a defaulter. A beginning has been made in the National Agricultural Credit (Stablization) Fund created by the Reserve Bank of India, but the cooperative institutions advancing short and medium term loans on the State Governments have not

really effective.

Credit may be advanced wholly in cash, wholly in kind or partly in cash and partly in kind. Due to scarcity in supply and undeveloped nature of sales organisations in the country, it becomes imperative to provide credit in kind for items which the cultivator cannot obtain for cash because of short supply. Fertilisers, pesticides, pest control equipment, small implements not widely marketed by commercial organizations, fall into this category. Credit in kind has the advantage also of preventing the diversion of money advanced as credit to purposes other than intended mainly for consumption. The difficulty, however, is often administrative, where the supply organization including storage etc., has not been built up by Government or cooperative institutions or adequate finance is not provided for purchase and stocking. Credit may also be partly in cash and partly in kind. As a matter of fact, in the "crop loan" system, which it is intended to make universal, there are three components. The first component comprising of the requirements of traditional agricultural practices, is to be advanced in cash. The second component, comprising of modern and improved inputs like improved seeds of high-yielding varieties, chemical fertlisers, and pesticides, are to be advanced in kind. The third component is again, a cash element estimated to be the additional requirement for putting into the field the improved or higher inputs.

Agricultural credit must be seasonal in nature related to the particular crop for which credit is needed. The preparation of the land, sowing or planting and harvesting of different crops vary according to the region, its climatic conditions and availability of irrigation water. The main seasons in India are Kharif and Rabi, but there are some spring or summer crops also. The credit must be made available in time to meet the cash requirements of the cultivator for wages, purchase of seeds, the application

of fertilisers and pesticides etc., according to the requirements of the particular crop. If any items in kind are supplied on credit, this must also be timely. Even long term credit for land improvement, sinking of wells, etc. has an element of seasonality, as certain types of capital works can be carried on only during the dry months.

3. AGENCIES PROVIDING CREDIT AT PRESENT:

The agencies providing credit to cultivators, as came to light during the Rural Credit Survey of 1951-52 and the All India Debt and Investment Survey 1961-62, could be listed as below:-

TABLE I

CREDIT AGENCY	PROPORTION OF BORROWINGS FROM EACH AGENCY TO THE TOTAL BORROWING OF CULTIVATORS *	
	1951-52	1961-62
Government	3.3	2.6
Cooperatives	3.1	15.5
Relatives	14.2	8.8
Landlords	1.5	0.6
Agriculturist Money-lenders	24.5	36.0
Professional Money-lenders	44.8	18.2
Traders & Commission Agents	5.5	8.8
Commercial Banks	0.9	0.6
Others	1.8	13.9

It is clear from the above table that the private money-lenders of different types have been the most important agency providing the largest amount of credit to cultivators for purposes of production or otherwise. The traders and Commission Agents as well as the Commercial Banks provide finance largely for marketing. Government has been a source of credit for a long time; it grants loan under the Land Improvement Loans Act 1883 for long term purposes like effecting improvements in land and loans to meet the current needs of the farmer under the Agricultural Loans Act of 1884. These

* Percentage relates to total borrowings in 1950-51 and

loans popularly known as Taccavi have been traditionally made to relieve the farmer of the immediate distress caused by natural calamities like floods and drought. These had practically no relevance to production except where they finance the purchase of seed or cattle in times of crop failure or cattle epidemics. In recent years, however, apart from advancing loans in time of distress, increased emphasis has been laid by Government on development and production. The loans are advanced now for the purchase of tractors and machinery, pumpsets, digging of wells and tanks, soil conservation and development of land as well as for the purchase of seeds, fertilisers and pesticides.

Cooperative institutions are the largest source of agricultural credit and have made remarkable strides in the period between 1950-51 and the present day. Cooperative Central Banks and Primary Credit Societies provide credit for short and medium term and the Cooperative Land Mortgage Banks for long term. The following table shows the growth of cooperatives in India since 1950-51:

TABLE 2.

	1950-51	1963-64
1. Number of Primary Credit Societies.	1.05	2.11
2. Membership (lakhs)	44.08	241.08
3. Loans advanced (Rs.crores)	22.90	295.20
4. Working capital (Rs.crores)	37.25	442.29.

Among other State institutions playing a significant role in agricultural credit, is the Reserve Bank of India, which maintains an Agricultural Credit Department. The financial accommodation provided by the Bank to various State Cooperative Banks has increased from Rs. 1.50 crore in the year 1946-47 to Rs. 254 crores in 1964-65, for short term loans and Rs. 7.91 crores for medium term loans. The Bank, however, does not

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finance agriculturists directly. It makes available the accommodation to the State or apex Cooperative Banks, which pass on the credit to the cultivator through Cooperative Central Banks and the Primary Credit Societies in the State. Every year the Reserve Bank fixes credit limits for the State Cooperative Banks taking into account a number of factors such as the owned funds by way of assured capital and deposits, their financial position, lending programme and previous performances. Apart from providing medium term loans to the Cooperative Banks to advance loans for purposes like financing land improvement works, development and maintenance or irrigation sources, purchase of livestock, implements and machinery etc. repayable within five years, the Bank has also been subscribing to the debentures floated by the Cooperative Land Mortgage Banks and making loans term loans to State Governments for subscription to the share capital of the Cooperative institutions. The Reserve Bank has created two Funds, namely, the National Agricultural Credit (Long term operations) Fund and the National Agricultural Credit (Stablisation) Fund. While the long term operations Fund is utilised for making loans and advances to State Governments and cooperative institutions for various purposes, the Stablisation Fund provides the State Cooperative Banks extension of time required to repay their dues on account of short term loans because of the cultivator's inability to pay due to widespread drought, floods or other natural calamities causing loss of crops. The other State institutions involved in providing agricultural credit are the State Bank of India and the Life Insurance Corporation of India. State Bank of India, apart from providing short term accommodation to various cooperative institutions, also contributes to the purchase of debentures floated by the Land Mortgage Banks.

Re-finance Corporation, which re-finances long term loans granted by the Land Mortgage or Scheduled Banks on approved schemes of land development, plantations, irrigation works, etc. by purchasing debentures of these banks. The Food Corporation of India has also been authorised to provide credit to producers against crops offered to be purchased by the Corporation after harvesting.

Commercial banks, which in Western countries play a significant role in providing agricultural finance, have not been important from the point of view of credit for agricultural production as such. In recent years, however, some of these banks have started taking greater interest in the financing of agriculture. The Syndicate Bank at Manipal in Mysore State is now providing loans for agricultural production in the district of South Kanara and has a programme of extending its business to other districts. Some scheduled banks have financed plantation schemes etc. to be re-financed by the Agriculture Refinance Corporation. The State Bank also has a scheme to provide credit for agricultural production. The commercial banking structure in India has grown in cities and towns in response to the needs of trade and industry. The rural interests, including agriculture, have, by and large, remained outside their scope. With their present capital structure, lending policies and organisation, it cannot be expected that these banks can enter into the field of providing credit for agriculture in any significant measure. Of course, with the opening of rural branches, particularly, the State Bank of India, some richer cultivators would undoubtedly open accounts in banks and can get accommodation on their personal security or by pledging crops. By and large, the smaller cultivators will remain outside the fold. The banks are also not likely to engage in medium or long term-lending under present conditions. A suggestion has been made that a separate Agricultural Banking Institution may be established, which would act as a buffer and would be able to refinance commercial banks enabling them to

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advance credit for agriculture, short, medium or long term, as the case may be. This suggestion deserves to be pursued.

In advanced countries, credit and hire purchase facilities are extended by manufacturers and dealers of agricultural implements, fertilisers, pesticides, seeds, etc. The Indian manufacturers and dealers cannot extend these facilities unless there are financing organisations behind them. With increased mechanisation and growing demand for machinery etc., it will be necessary to develop these facilities in the country which will relieve the pressure on cooperative institutions and government and also obviate the need for mortgaging the land for every medium or long term loan, whatever the purpose may be.

4. DEFECTS OF EXISTING ARRANGEMENTS:

The main defect of the existing arrangements for institutional credit is inadequacy, which is twofold. First of all, the coverage is too small. Only 39% of the cultivating households are members of cooperative societies which are the biggest providers of credit. Only half of the member households borrow from societies. Again, if it is remembered that 20% of the Primary Societies are dormant and about 40% are non-viable with very small membership and meagre resources, it will be realised that cooperative credit is effectively utilised by a small fraction of cultivators. That also is monopolised by the relatively well-to-do farmers in most States, leaving the genuine credit needs of the vast majority unfulfilled. The second aspect, is the inadequacy of institutional finance as compared to the needs. This is reflected in the percentage of loans from cooperative and Government of the total borrowings, as given in Table 1 above. Not all the loans advanced by cooperatives and State Governments are utilised for the productive purposes. Sample studies made by the Programme Evaluation Organization of the Planning Commission reveals that on an average more than 41% of the borrowers from cooperative societies admitted diverting their

7% to 89% as between States where cooperatives are well developed and where they are not. The picture cannot be very different for State Taccavi except for items supplied in kind. No wonder, that no real correlation can be established between amounts disbursed as loans for production and the increase in production. Another bane of the existing arrangements is lack of timeliness. It has been noted earlier that the needs of credit for agriculture is strictly seasonal but often neither cooperative nor Government loans are available in time. The result is, that either the needed inputs cannot be applied or that farmers have to depend on money-lenders. Another defect is inadequate arrangements for recovery of loans. The overdues of cooperative societies range from 10% in Madras to 76% in Assam. The non-repayment and overdues of Government Taccavi must be worse, as on top of factors like natural calamities, making realisation of loans difficult, there is the reluctance of democratically elected State Governments to make determined efforts to recover taccavi loans.

Almost all over the world, the cooperatives have been considered as the most suitable institutional agency to provide agricultural finance. To develop them has been the sheet anchor of Government policy for more than fifty years and a special effort has been made since Independence. The movement, however, suffers from various defects and drawbacks some of which have been incidentally touched upon in the previous paragraph. These have been examined in detail by various high level committees which have made recommendations. The problems and difficulties are also discussed every year by the Reserve Bank with each State and in the annual conference of State Registrars and Ministers convened by the Department of Cooperation of the Government of India. Many of the shortcomings are no doubt, the outcome of deliberately accelerated pace of expansion pursued in the last ten or fifteen years but others seem to be more basic. In almost all countries cooperatives have grown by the effort of people with homogeneous interest combining together for their mutual

benefit. In India it has been a Government sponsored movement with the usual official approach and without the preparation of the ground or imparting the pre-education that is necessary. By and large, cooperatives have been looked upon as an agency from where money can be got easily which need not be repaid except under duress just as Taccavi loans. The value of cooperatives in improving the economic condition by joint effort, treating every member as equal with complete democratic control over management, the full appreciation of the need for thrift and investment of surplus over expenditure in one's own cooperative with self-reliance as motto, has not taken root. The right leadership of a few individuals devoting part of their time in management and looking to the interests of all the members equally, and not merely to their own or their relatives, has not developed. These factors probably explain why the growth of cooperatives has been so uneven in the country. In three States this can be termed outstanding, not only in the field of credit but marketing and processing also. In five States, the conditions are just deplorable. In the remaining eight States things are neither too bad nor too good. Even in the States where development is excellent, it is not uniform in all the districts and all the villages. In other States also there are bright patches here and there.

The other most important source of credit is Government taccavi, the origin of which is in relieving distress. The loans were never recovered in full even in the days of British Raj and since Independence, they are hardly recovered at all. To-day it has an added significance as most of the loans are for productive purposes, short or medium and long term. But Government is not an ideal banker for giving credit. The complicated procedures and red-tape are there and there is insufficient realisation that credit for agricultural production must be seasonal and timely.

Development Blocks, Industries and, may be, other Departments, are all advancing loans for agriculture with no expert staff to assess the needs and the repayment capacity, to supervise utilisation and repayment. Of course, the Government loans advanced in kind in the shape of seeds, chemical, fertilisers, pesticides and implements have been wholly beneficial and have prevented misutilisation or diversion, provided they were timely. But recovery is another question. Agencies other than Revenue Deptt. take little interest and the Collector is too busy to give any real attention to it. Some States have tried the experiment of channelling all loans through Panchayat Samitiés; others through cooperatives, which the Central Government has urged them to do so. But funds of different Departments are not always released timely. No flexibility is left to these organizations and funds may be earmarked for purposes not in demand in the locality. No eye is kept that Panchayat Samitiés and Cooperative Central Banks are earnest and active and verifications by Revenue Department take their own time, regardless of season.

5. CREDIT IN THE CONTEXT OF INCREASING AGRICULTURAL PRODUCTION AND CRITERIA OF A SOUND SYSTEM:

If India is to make a break through in agricultural production resulting in self-sufficiency in foodgrains and fibres and other crops, agriculture has to be revolutionised by adopting scientifically and technically approved practices, and making much heavier investments - long, medium and short term. The cultivators will need vast quantities of high-yielding seeds, fertilisers and pesticides, as well as implements and machinery. In addition, a great deal of minor irrigation, land improvement, soil conservation and work on the land necessary to attain maximum utilisation of available water resources will be necessary. Investment in these cannot take place without a sound system of agricultural credit when the vast majority of cultivators have no surplus savings for investment purposes. The credit system must ensure adequacy of finances for short, medium or long term in correct

Land reforms have not produced the intended results. Security of tenure and fixation of economic rents have to be ensured to tenants and share-croppers. Only under such conditions the actual tillers of the soil can have incentives to invest.

(f) Adequate Rural Infra-Structure:

The overall economic development of rural area is a complex process and depends, amongst others, on the presence of an adequate infra-structure of such items as good roads, adequate storage, provision of power etc., and educational and health services in the rural areas.

7. AN ALTERNATIVE SCHEME OF CREDIT:

It would be clear from the deficiencies of the existing arrangements and the criteria that a sound system of agricultural credit, should satisfy, that urgent measures have to be taken to put the agricultural credit structure on a sound footing and to consider alternative scheme or schemes.

(a) Assessment of credit needs:

The first step is to assess the credit needs for agriculture. No comprehensive study exists. Recently, a Study Group, in the Government of India, made an assessment for the short term credit. The Group's estimate of requirements in 1966-67 was Rs. 735 crores and for 1970-71 Rs. 1166 crores, for production purposes alone. No items of consumption were considered and even items like land revenue, rent, irrigation rates and interest charges, which enter into the cost of production, were omitted. A Panel of Economists reviewed these estimates and suggested certain downward adjustments which if accepted, would bring down the figures to Rs. 655 crores in 1966-67 and Rs. 955 crores in 1970-71. The Panel of Economists themselves made two separate estimates; one on the basis of the ratio of borrowings for current expenses to National Income from agriculture. This gave a figure of Rs. 956 crores for 1966-67 and Rs. 1228 crores for 1970-71 of anticipated

was based on per acre borrowing for current expenses of cultivating households. Making provision for financing improved inputs like fertilisers etc., the total anticipated borrowings for current expenditure including household expenditure came to a higher figure of Rs. 1048 crores for 1966-67 and Rs. 1341 crores for 1970-71. In round figures, it may be estimated that the short term borrowing needs of the cultivator including requirements for consumption expenditure, would be of the order of Rs. 900 to 1000 crores in 1966-67 and Rs. 1200-1300 crores in 1970-71.

The estimate of medium term credit made by the Study Group for the Fourth Five Year Plan period, ~~was Rs. 406~~ crores and for long term credit the figure was Rs. 822 crores. The annual borrowings, of course, would be a percentage of the total. For calculating the medium and long term credit needs, the yard-sticks used were the Fourth Plan targets for digging of wells, tubewells and provision of pumpsets etc. land reclamation, and soil conservation; development of irrigated areas including digging of field channels, land levelling etc., investment in orchards and plantation crops other than tea and coffee and the cost of purchase of livestock, tractors and other mechanical equipment. The estimate of credit was a percentage of the total cost, which the cultivator is likely to borrow: the rest being borne by the cultivator.

As against these estimates of credit requirements, the targets of the cooperative institutions, the largest credit agency for agriculture, is Rs. 650 crores for short and medium term loans combined, for the last year of the Fourth Plan, namely, 1970-71. For 1966-67, it is Rs. 453 crores. For long term loans, the target is Rs. 300 crores for the entire Plan period.

The achievement of the cooperative institutions providing short and medium term loans by the end of 1965-66 is likely to be Rs. 380 crores as against the Third Plan target of Rs. 530 crores. It is doubtful, if the 1966-67 target of Rs. 453 crores can be reached. It should be also remembered, that a good proportion

of cooperative short and medium term loans has probably gone for meeting consumption expenditure and not for productive investment.

The long term target of Rs. 150 crores for the Third Plan period is likely to be realised by the Cooperative Land Mortgage Banks in the country and except for the percentage of the total advanced to repay old debts, the bulk of it should have been utilised for productive purposes.

(b) Agencies to be employed to ensure sufficiency of credit:

(i) Cooperative Institutions:

In the previous paragraph an idea has been given of the resources likely to be made available by the cooperative institutions as well as State Governments. Placed against the estimate of credit requirements, the feasible resources fall appreciably short and the gap has to be made up. The accepted National Policy has been to develop cooperative institutions and they would continue to play the dominant role. At the same time, the unevenness of development of cooperation as well as the defects and deficiencies of the system have been noted. As things stand, the cooperative will not be able to meet more than about 25% of the total credit demand for agricultural production. In order to play their role effectively, even within this limitation, urgent reforms like elimination of dormant societies and making a fresh start wherever possible, amalgamation of non-viable societies into viable units, strengthening the internal resources of cooperative banks and primary societies, have to be undertaken. Hitherto, most of the cooperative loans, particularly short term, bore no relation to needs of production but were based on the assets of the borrower. The introduction of the "Crop Loan System" is a step in the right direction and should be universally adopted. Upto date only 5 states have agreed to put it into practice but the extent of implementation is not known. Apart from the vastly increased

Authorities are expected to assist individual farmers in preparing their farm plans from which the requirements of crop loans would be calculated. The primary societies have, therefore, to work in close cooperation with the Block Development Authorities to make arrangements in time for the funds necessary and their disbursement. The present procedures have been found complicated and cumbersome as well as time-consuming. In many States loan application forms are being revised to make them simpler. It is also necessary to have a close look at the procedures adopted by Central Banks sometimes scrutinizing every individual loan case resulting in great delay in sanctioning the amount to the primary societies and their ultimate disbursement. It is in the essence of cooperation that every institution should have maximum flexibility to conduct operations according to local needs of which it is the best judge. The cooperative system, right from the Reserve Bank downward, has tended to acquire certain rigidity, which should be removed, as far as practicable, without detriment to sound banking principles. The next difficult problem is the supervision over utilisation and prompt realisation of loans due, so that overdues do not accrue. The primary credit societies have very little staff; many not having even full time qualified secretaries. Some Central Banks have got supervisory staff but others have not got them in adequate strength. Of course, the Managing Committees of cooperative societies should play an active part in the entire operations including supervision over utilisation and collection of dues which probably they do not do except, in rare cases where they are active, energetic and public-spirited. The Panchayati Raj Organization can play a very useful role in this behalf, particularly by creating a necessary psychology among cultivators. The Block Development staff as well as the Government cooperative staff have also a useful part to play. What is necessary is to build up close integration and cooperation in their working at various local levels. It has been mentioned briefly earlier, that one of the ways of meeting the problem of

overdues effectively is to organize cooperative marketing in an effective manner in every rural marketing centre which could help the credit societies by collecting their dues when the cultivator's produce is brought to the marketing societies for sale. The Government procurement agencies like the Food Corporation or the State Government Departments responsible, can also play a useful role provided the necessary coordination in the working of these various agencies can be brought about and Departments do not continue operating in a vaccum. The cooperative credit structure in India is based on a three tier system, namely, the apex of the State Cooperative Bank, the Districts Central Banks and the Primary Societies. The rate of interest gets added to at every stage to meet the administrative and other expenditure of the different organizations and is very much higher at the receiving end of the cultivator than the concessional rates at which Reserve Bank makes funds available. While it is not intended to interfere with the three tier structure where it is functioning effectively, there does not seem to be any justification to impose it uniformly in all areas where conditions may be different. For instance, if the Central banking structure is weak, there should be no objection for the apex bank to maintain branches in districts and deal directly with the primary societies. Similarly, if a primary society provides credit as well as supplies and also does marketing, there should be no objection to ask it to give up one or the other activity on grounds of theory or a rigid application of a particular pattern.

In some areas the development of cooperative societies has been hampered by the issue of Government Taccavi at a lower rate of interest than the cooperative loans. While resources are so short and large percentage of cultivators does not benefit either from the cooperatives or wholly from Taccavi, there is no point in having competition between the two systems. The

have accepted. This again should not be enforced rigidly without a thorough scrutiny of the strength of cooperative structure in the areas to satisfy oneself that the cooperatives are in a position to meet the credit needs of all farmers. It has been pointed out earlier that, in some districts where the practice has been introduced, the desired results have not been achieved. Therefore, there will be no option but the issue of Taccavi by State Governments, but they should ensure that the rates of interest charged are the same and cooperative loans and Taccavi in the same area should be complementary and not competitive leading to re-financing. The strength of a successful cooperative credit system lies in its own resources, namely, the share capital and deposits of members at the primary level; and deposits from members of the public, various institutions and trade and industry etc. at the Central bank and the apex bank level which carry on considerable banking operations apart from advancing loans to primary credit societies. Generally speaking, the idea of self-reliance and thrift which means investing of available savings in the cooperative societies by its members has not caught on in any significant extent in In ia and the credit societies are looked upon merely as sources for loans. Under present conditions, there are many handicaps. The prosperous rural farmer has become a money-lender in his own right, replacing to a great extent the professional moneylender, and can invest his savings at a much profitable rate by giving loans direct. He often borrows from cooperative societies upto the limit allowable due to his assets and reinvests the funds at higher rates of interest in money-lending and other business. Deposits in a cooperative society are not attractive enough from the investment point of view. There is also the active small savings compaign conducted by the State Governments which mops up a great deal of rural savings. The Life Insurance Corporation of India is also extending its business in the rural areas and savings are partly being invested in insurance policies. Lastly, the hunger of

the Indian villager for gold and silver remains, in spite of the Gold Control Order and the stoppage of the import of silver. It will require a great educational and missionary effort to convince the cultivator, particularly, the smaller man, who is not interested in investment for gain as such, to put in whatever surplus or savings he has, in his cooperative society which would be to the interest of himself as well as the entire farming community of the locality. If, however, the present state of affairs continues, very much cannot be expected from mobilising rural savings for investment in cooperatives and if the Government as well as the public sector is actively in the field mopping up savings they should be ploughed back to the agricultural credit structure as far as practicable.

(ii) Agricultural Credit Corporations:

The Informal Group on Institutional Arrangements for agricultural credit, appointed by the Reserve Bank of India in 1964, has come to the conclusion that in spite of the efforts of the Reserve Bank of India and the Government, much headway has not been made in some parts of the country and the progress in the supply of agricultural credit through the cooperative agencies for meeting the current and development needs of the cultivators, has remained uneven. The Group has, therefore, recommended that as a transitional measure, Agricultural Credit Corporations be set up in the five States of Assam, Bihar, West Bengal, Orissa, and Rajasthan, where the cooperative movement is relatively weak. These Corporations should withdraw from operations, as and when the cooperative movement in the States concerned, gets strengthened. It is contemplated that these Corporations will be established by legislation undertaken by the Government of India, Their capital will be subscribed, to some extent, by State Governments but in the main, by the Government of India, Reserve Bank of India and the State Bank of India. The working funds will be borrowed from the State Bank of India or the Reserve Bank or both. The Reserve Bank of India will have to undertake

short term loans for agricultural production on the basis of rational and production-oriented loan policies as embodied in the crop loan system. The general idea is that the Corporations will function, wherever no active cooperative exists or the existing cooperatives cannot easily be rendered active. Their areas of operation will, therefore, have to be demarcated carefully on the basis of a quick investigation and classification of villages for the purposes. Such areas may not be contiguous or cover the whole district. Though the Corporations may advance loans to substantial cultivators direct, they may find it prudent and convenient to make loans to small cultivators on a group basis, is against joint bonds. The Corporations will aim at linking of credit with marketing and will advance loans to foodgrain producers on condition that the borrowers agree to repay the loan by definite delivery of grains to the Food Corporation of India or its agents. For other crops also, similar arrangements, through marketing societies, are contemplated. The Corporation will accept non-refundable deposits from the individuals borrowings from it, in lieu of the share capital which they would have contributed, if they had been borrowing from a cooperative. The intention is that in due course, when the Corporations would withdraw, these deposits would be transferred to cooperative societies to serve as share capital of these societies. The Corporations may also accept deposits from members of the public, local bodies, quasi Government institutions, and cooperative institutions. If there are dormant cooperative societies in the villages, where the Corporations will function, these will have to be liquidated.

The essence of the policy behind the recommendations to start five Agricultural Credit Corporations, in the four Eastern States and Rajasthan, is that these Corporations would be transitional and even in those States concerned they will not operate in areas or villages where existing cooperative societies are in a healthy state. Experience gained in the Intensive Agricultural Districts Programme has led to the conclusion that even in areas

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where the cooperatives are quite strong and active, according to the present standards, there is need for an alternative source of credit in order to support an agricultural development programme. Due to inadequacy of the financial resources and coverage of the cooperative societies, the IADP Programme has to depend very largely on Government Taccavi loans for short term as well as medium term purposes in addition to whatever the cooperatives could provide in those areas. The Agricultural Credit Corporation as recommended by the Informal Group, would advance only short term credit. There is need, however, of medium and long term loans, if development is to proceed on the lines contemplated. Without the backing of longer term loans for investment purposes, the demand for short term loans for production cannot be generated. Or sometimes, the short term loans may be wasted or misutilised as the conditions for intensive agriculture have not been created by capital investment. Mr. Miles, Leader of the Ford Foundation Team, working on the IADP Programme, has recommended the creation of an All-India Agricultural Corporation, on a permanent basis, to provide dependable source of production credit, short term, medium and long term, as the case may be, which would have the authority to open branches even in States where the cooperative movement is more successful than in the five States singled out by the Informal Group. It has been stated earlier that even in relatively advanced States, so far as cooperation is concerned, there are districts or parts of districts, where cooperative development has been below the standard achieved in other districts. According to Mr. Miles, an All India Corporation would be able to command greater resources and concentrate managerial skill. It will also have more flexibility in operation. Sixty per cent of the cultivators, are still outside the cooperative fold and many cultivators may not wish to join cooperatives due to personal reasons. A line of credit should be available to them also. He has suggested safeguards

developed to supplement the cooperatives, they should be strengthened as rapidly as possible, so that they can carry on the ever-increasing operation of the responsibility of serving cultivators. His contention is that the cooperatives are human institutions created to perform primarily business functions and being human institutions they are subject to common human feelings. They should not be given responsibilities greater than their ability to carry.

(iii) State Taccavi:

Taccavi continues and will continue to play an important role as a line of credit for a long time to come. In Intensive Agricultural Programme Areas, cooperative credit had to be supplemented with taccavi. The Government of India have planned to saturate 32.5 million acres by the high-yielding varieties of food crops, both exotic and foreign, over the Fourth Five Year Plan period to secure an additional production of 25 million tons. It is essential for the success of this programme that credit for the necessary inputs like seeds, fertilisers, pesticides, etc. which will be required in much larger quantities, are ensured. Until cooperatives in those areas are in a position to shoulder the entire responsibility of providing 100% credit, needed by all the cultivators in these areas, or a credit Corporation or Corporations are established, Government will have to continue advancing a supplementary line of credit through taccavi. The best form, it can take, would be loans in kind, of seeds, fertilisers, pesticides and essential implements beyond the cultivator's reach or not readily available, the supply of which has to be arranged. To fill up the gap in medium term needs like purchase of pumpsets, digging of relatively inexpensive wells etc., Government have to step in. There is a big gap in the requirements for medium term credit and its supply from existing institutions. The quantum of medium term credit disbursed by Central Banks and Primary credit Societies does not exceed 10 per cent of the total loans advanced. Lastly, in States, where the Land Mortgage Bank structure is not well developed, the State Governments will have to continue advancing long term loans as well. There is also

another area where nothing can replace Government taccavi, namely, the areas where agriculture is conducted by backward subsistence type cultivators inhabited mostly by scheduled tribes and castes and other backward classes. There is no basis for business type credit in such areas because of the small amount of marketable surplus produced. The cooperative societies as well as the Agricultural Credit Corporations, if established, would have to operate on business lines adopting sound banking practices having regard to increasing agricultural production. They cannot undertake the responsibility of advancing credit, which is more or less of the subsidy type to such backward areas with marginal and sub-marginal cultivators.

An active developmental role of Governmental taccavi would involve considerable rationalisation and reform of arrangements. Taccavi loans are advanced by Revenue, Agriculture and Community Development Departments of State Government. The responsibility for these loans should be centralised in a single department, preferably, Agriculture, having specialised staff for the administration. The staff should supervise the utilisation of the loans as well as recovery, effectively. There is great deal of deficiency in this behalf at present, that is why, the contribution of taccavi loans to increased production is not proportionate to the total amount of money disbursed.

(iv) The State Bank of India and Commercial Banks:

The role played by the State Bank of India and the commercial banks have been briefly mentioned earlier and certain suggestions made. The State Bank has a scheme of starting Rural Pilot Centres to play a more effective part in the direct as well as indirect provision of rural credit and to the extent possible, to fill in the gap in the working of the agricultural credit institutions in the rural areas. Broadly, the idea is to establish "Pilot Centres" i.e. each selected branch, existing or new, will cover a number of surrounding villages, and not merely the town or large village

for agricultural production and marketing along with its other normal functions. As experience is gained, more Centres, may be opened and activities expended. The scheme would be coordinated with other development schemes. It is necessary, that the scheme is brought into operation and its progress will be watched with interest. Commercial Banks can play a larger role provided there is an authority for refinancing.

(v) Foodgrains Corporation of India:

The Foodgrains Corporation of India is permitted by law to extend credit facilities and it has also been accepted as a policy that it could advance loans to cultivators against promises of delivery of grains after harvest. It is intended to make the maximum use of existing cooperative institutions in the areas of its operation. The credit advanced by Foodgrain Corporation will, however, be a marketing credit but it will incidentally help production, as the loanee may utilize all or some of the funds to invest in production requirements. As the Corporation will have direct dealings only with a limited number of large producers, the impact of its advancing of credit on production is not likely to be very great. It has, however, embarked on a pilot experiment in one State of advancing seeds, fertilisers, and pesticides etc. against a contract to repay by way of a fixed quantity of grains at stipulated prices when the balance will be paid in cash. This experiment should be watched with interest. Industries based on agriculture can also enter the field in the same manner as Imperial Tobacco does with tobacco growers in certain areas in the South. The credit needs of jute, cotton and oilseed growers could be met partially at least, if the industries concerned took a larger interest and 'adopted' certain selected areas.

(vi) Fertiliser Corporation:

The Fertiliser Enquiry Committee has recommended that a Fertiliser Corporation should be established to handle procurement and distribution of fertilisers throughout the country and it should also be authorised to advance credit, which should filter down to the individual cultivator through the different agencies of wholesale

and retail distribution. If this Corporation comes into being and can operate on an All India basis, it can replace State taccavi for fertilisers.

(vii) State Seed Corporation:

A suggestion has been made that each State Government should establish a Seed Corporation, which will look after the growing, procurement and distribution of pure and certified seeds. These Corporations can also advance credit.

(viii) Agro-Industries Corporation:

Agro-Industries Corporationsare going to be set up in some States to look after the supply of agricultural implements of different descriptions and also undertake manufacture wherever possible. These Corporations, if established, can also advance credit by way of hire-purchase terms to cultivators.

CONCLUSION:

In order to realise a programme of increased agricultural production in the country, which has become imperative, it is necessary to adopt a realistic policy of credit for agriculture. Any doctrinaire approach should be forgotton and the aim should be to make cent per cent credit available to the agriculturists, through whatever agency it is possible, except that of the private money-lender. The Cooperative Movement will continue to occupy the predominant role but its deficiencies have to be removed. Agriculture in India, however, cannot wait till the Movement has been revitalised to meet the entire credit needs of the cultivator. Increase in agricultural production must come first and if the cooperative movement is inadequate or lags behind, supplementary lines of credit have to be organised either as a temporary or a permanent measure, as the case may be. The approach should be flexible enough and this calls for a multi-agency approach, indications of which have been given in the preceding paragraph. The multi-agency approach, however, would

supplies are likely to be short of requirements for many years to come. Therefore, there is no room for competition by different agencies providing agricultural credit or one working to the detriment of the growth and development of another. These operations should be fully complementary. The risk of overlapping and over-financing of areas or individuals should also be guarded against. There should be established a coordinating body at the Central Level with concerned Ministries and Departments and the Reserve Bank of India, State Bank of India, Life Insurance Corporation, representatives of commercial banks, Agricultural Credit Corporation or similar Corporations and representatives of Union of Cooperative institutions. The State level coordinating bodies should also follow the same pattern with representatives of regional or local agencies of All-India Organizations and appropriate State Organizations. At the district and block levels, the concerned local officers and representatives of cooperative institutions and Panchayati Raj, should find a place. These bodies should assess the local requirements and the expected resources and chalk out areas of operation and fields of action for each agency as well as deciding upon broad policies. If agriculture is to receive the highest priority in the Fourth Plan, it should be translated into action by putting the credit structure on a firm footing to finance the agricultural operations.

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For Participants Only

AA.II/7

SEMINAR
ON

AGRICULTURAL ADMINISTRATION
(March 9-12, 1966)

COOPERATIVE MARKETING OF AGRICULTURAL PRODUCE

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C O N T E N T S

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COOPERATIVE MARKETING OF AGRICULTURAL PRODUCE.

I.

APPROACH TO AGRICULTURAL MARKETING.

Introduction:

The role of agricultural marketing in the development of an agricultural economy has, from time to time, received a varying degree of recognition. In 1945, in a Conference, held at Quebec, under the auspices of the United Nations, marketing was described as "the crux of the whole food and agricultural problems". This statement is a reflection of the fact that inadequacies in the agricultural marketing system may have a crucial bearing on the general development of agriculture. On the other hand, an efficient and orderly system of agricultural marketing which secures the interest of the primary producer and furnishes him with an incentive for greater production and better quality goods, can tend to reinforce the programmes which are directly aimed at increasing agricultural production. One of the significant elements in such an orderly and efficient system of agricultural marketing is provided by a network of primary producers' marketing cooperatives.

In this paper, an attempt has been made to analyse the factors which point to the need for cooperative marketing in India. Thereafter, a review has been made of the progress of cooperative marketing prior to and under the Five Year Plans. An indication has also been given of the principal problems facing the marketing cooperatives as well as their prospects. The scope of the paper has been deliberately restricted to cooperative marketing of crops to the exclusion of other types of agricultural marketing. Again, no attempt has been made to deal with the problems of cooperative processing which are otherwise an integral part of cooperative marketing

but which constitute a vast subject by themselves. However, to place cooperative marketing in the overall perspective, some indication has been given of the various regulatory and other measures taken by the State in dealing with problems of agricultural marketing.

Role of the State:

In India, as in many other under-developed countries, there has been a natural preoccupation with the problems of agricultural production and this has tended to keep the problems of agricultural marketing in the background. In 1928, the Royal Commission on Agriculture in India, while discussing the activities of the Provincial Agricultural Departments, was constrained to observe that "It cannot be said that they have been able to give him (the producer) substantial help in securing the best financial return for his improved quality and his increased out-turn. Except to a limited extent, they have regarded the problems connected with the marketing of his produce as outside their purview". In pursuance of the recommendation of the Royal Commission, the Central Government created a Directorate of Marketing in 1934. However, the activities of the Directorate remained rather limited. It is only in the post-Independence period that concerted efforts were made for the implementation of measures directed towards the improvement of the agricultural marketing system. One of the principal planks of this programme was the enactment of the Agricultural Produce Markets Act and regulation of markets. Upto the end of 1964-65, 11 States had passed such Acts and brought 1488 markets under statutory regulation. It is expected that the remaining 1000 markets or so would be brought under such regulation in the course of the Fourth Plan period.

The effectiveness with which the Agricultural Produce Markets Act were enforced varies from State to State. There has been a tendency in some States to restrict the scope of the regulation to a limited number of commodities. For instance, food grains are not yet regulated in the Andhra region of Andhra Pradesh. Similarly,

the extension of Agricultural Produce Markets Act to special commodities such as fruits and vegetables, tobacco, etc. has been done only to a very limited extent.

Alongside regulation of markets, efforts have been made to introduce grading services on a voluntary basis for a variety of farm products with a view to facilitating internal marketing. Compulsory quality control before export has also been enforced for a number of commodities. In order to make an impact on the marketing system at the primary level and to give benefit to the producers, a scheme for establishment of grading units by the State has been introduced. By the end of March, 1965, 307 grading units have been set up. In addition, a number of oil grading laboratories have also been established.

Other activities undertaken by government relate to marketing research and marketing extension. The research studies are, at present restricted to foodgrains, oilseeds and a few important fruits and vegetables. Alongside, measures have also been taken to provide training courses for the marketing personnel. Finally, while regulation and control of forward markets have been undertaken for some time, recently the Government have established an Agricultural Prices Commission and introduced a policy of fixation of minimum prices for important crops. These are indications of a new awareness of the role of marketing in agricultural development.

Need for Cooperative Marketing:

Through various regulatory measures and the administration of a positive agricultural price policy, the State can no doubt help to create the minimum conditions necessary for an orderly and efficient system of agricultural marketing. The extent of orderlineds and efficiency actually achieved is, however, largely dependent upon the agricultural producers themselves and herein lies the role of voluntary action by such producers through cooperative organisations.

The need for cooperative marketing in India arises from a variety of factors. In the first place, these factors are connected with the malpractices in the existing system of agricultural marketing. Some of these malpractices, such as arbitrary deductions from the price of the produce, manipulation of the weights and scales, and the collusion between the broker and the buyer, gained wide notoriety in the past. In 1928, the Royal Commission on Agriculture referred to them as "nothing less than theft". Since then, conditions have improved somewhat on account of various measures that have been undertaken. However, a number of malpractices still continue to vitiate the marketing system. In several markets, the marketing charges are still found to be numerous and variable. In some of these cases, the charges are fictitious, i.e., the service or the purpose for which the levy is made does not exist. The various studies made by the Directorate of Marketing, Government of India, reveal a wide variation in the market charges and also a lack of uniformity as to the party who is to pay the particular charge. The Rural Credit Survey Report had described the prevalent position as follows:-

> "While standards of marketing have improved in most of the relatively few regulated markets which have been established, a number of malpractices still exist even in these, since personnel and enforcement are two great problems, not always sufficiently attended to, much less solved. Sometimes the malpractices take a fresh lease of unauthorised life just outside the market, for the private interests are strong, the advantages of evading strict regulation are many and the producer is in no position to seek eventual advantage and protection from law at the cost of the immediate disadvantage involved in the loss of powerful customers who are also sources of credit and finance. Moreover, there is the very grave lacuna that no control at all is exercised over village sales".[1]

The effect of various malpractices tends to be aggravated by the circumstances that most of the cultivators are indebted to the trader, who is also the money-lender. In this situation, the marketing system, in the words of a U.N. Report "usually degenerates

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1. All India Rural Credit Survey Report - Vol. II -- P. 105.

into a truct system that embraces the weaker partner in a complicated network of indebtedness, obligations and eventual economic exploitation".[2]

The need for cooperative marketing does not rest merely on the fact that it can assist in minimising various malpractices. There is also a positive aspect to cooperative marketing. It is envisaged that cooperative marketing of agricultural produce should help to ensure a better return to the primary producer. This is partly the result of the educative process which is set in motion when there is a system of marketing by the farmers and for the farmers. On this point, one cannot do better than to quote the Cooperative Planning Committee (1945) :

> "No influence is so important in the economic education of farmers as their own efforts in cooperative marketing. The very attempt on the part of farmers to solve their problems teaches them basic economic truths. The operation of cooperative marketing organisation teaches farmers that agriculture is primarily a form of business. Cooperative marketing also teaches farmers that the problem of marketing is closely related to the problem of production. The marketing organisations have found from experience that the demand for agricultural products is increased by an improvement in production methods which results in products of higher quality. Again, when farmers themselves undertake marketing programmes, they become familiar with practices which greatly reduce the economic value of their produce. Cooperatives also serve an important function in supplying information on the many factors which affect the economic status of farmers".[3]

Apart from the influence which marketing cooperatives can exercise on the level and quality of agricultural production, the marketing cooperatives aim at helping the primary producer to capture a larger share of the consumer rupee. At present, various marketing functions such as assembly, storage, processing, insuring, financing, standardising, sale and transportation are performed by a large number of persons who play the part of middlemen and market functionaries. Often there are more such functionaries than are necessary and their charges are generally out of proportion to the services that they render.

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2. Pamphlet on Rural Progress through Cooperatives.
3. Report of the Cooperative Planning Committee - P.58-59.

As noted by the Prices Sub-Committee, there is "wide disparity between the price at which the produce is sold to the consumer and the price which the cultivator actually receives, with the result that much too lower a proportion of the consumers' rupee reaches the cultivator".[4]

The experience of successful cooperative marketing societies shows that price spread between producer and the consumer can be reduced to the advantage of the primary producer. A cooperative marketing society, by bargaining for all its members, can obtain advantages not obtainable if individual members sell independently. There is essentially a reflection of the fact that, in the conditions of Indian agriculture, the average farmer with his tiny holding, contributes a very small amount of production and his marketable surplus is almost like a drop in the ocean. On the other hand, the marketing power of a large network of federally organised marketing cooperatives can make itself felt. The cooperative marketing system can grade and pool the produce and spread the sales over a favourable period. It can also stimulate demand by advertising and other means that would be uneconomical for the individual farmer. In this connection, the following extract from a study of cooperative marketing of cotton, made by the Directorate of Marketing, Government of India, is relevant:-

> "The modus operandi followed by various types of cotton cooperatives under study have been different. The various types of marketing functions undertaken by them are also different. It is, therefore, very difficult to compare their relative performance. However, the share of the consumers price as obtained would give an indication of the efficiency of different patterns of marketing of cotton followed by the cooperatives under study. The data relating to price spread collected with regard to transactions made by various cooperatives are not adequate. As such no definite conclusions can be arrived at from these. Nevertheless, the data do indicate that in Surat and Pudur where the cooperatives have been able to bring in the vertical integration by undertaking all the marketing functions right from the assembling to the final disposal of the lint to the mills, the share of the producer is significantly high being 88.99 per cent

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4. Report of the Agricultural Prices Sub-Committee.

for Surat and 90.80 per cent for Pudur. In other areas where the cooperatives have not taken up all the marketing functions and have restricted their activities only upto the assembling and ginning stage and where the vertical integration has not yet been attempted, the producer's share is comparatively less being 82.60 per cent the lowest in case of Arsikere which is a local transaction. Even in case of Gadag where the cooperative society has adopted a system of pooling and grading of kapas on the basis of purity and ginning percentage the producer's share comes to 83.42 per cent only".[5]

It is pertinent to mention that cooperative organisations of agricultural producers appear to constitute an essential condition for the successful implementation of various regulatory and administrative measures that might be taken by the State for stabilising or improving the agricultural marketing system. Even the functioning of the Marketing Boards is considerably facilitated if there is a network of producer cooperatives operating in collaboration with them. It is in this context that the Tea Board and the Coffee Board in India have lately evinced considerable interest in organising cooperatives for processing of tea and coffee.

Finally, the need for development of cooperative marketing arises from the consideration that such development is essential for a large scale expansion of cooperative credit. In the scheme of integrated development of cooperative credit and marketing, as advocated by the All India Rural Credit Survey Report, marketing cooperatives can act as agents for the recovery of loans advanced by credit societies and thus provide a built-in mechanism for recovery of production finance issued by credit cooperatives. In this context, the absence of cooperative marketing can, beyond a stage, become a limiting factor on the growth of cooperative credit.

II.

PROGRESS OF COOPERATIVE MARKETING

Cooperative marketing prior to 1951:

Towards the commencement of the present century, Henry Wolff,

Cooperative Alliance, emphatically maintained that the disposal of agricultural produce is the task whose accomplishment will be the yard-stick for ultimately judging the success of agricultural cooperation. The strategy of several developing countries has been in line with this approach. In some of the African countries, agricultural cooperative enterprises were started in the realm of marketing and, as cooperative marketing developed, cooperative credit has been promoted as ancillary to marketing. In India, however, cooperative credit marked the beginning of the cooperative movement and other functions, particularly cooperative marketing, came much later. The reasons for this chronological order followed in India are not difficult to seek. In the conditions of rural indebtedness, where the grower is in the grip of a private money lender, the latter has a firm hold on the former's produce. In such a situation, to use the words of All India Rural Credit Survey Report, the primary producer is "literally, legally and in practice" at the mercy of the village trader - money-lender.[6] It is, therefore, not surprising that he cannot easily take to cooperative marketing until he is released from the shackles of the private creditor. It was in this background that the development of cooperative credit in India proved to be conducive to, if not a pre-condition for, the development of cooperative marketing.

Generally speaking, prior to Independence, only a few sporadic efforts were made in the development of cooperative marketing. In 1945, the Cooperative Planning Committee recommended that, within 10 years, 25% of the total annual marketable surplus should be sold through cooperative organisations, and, for this purpose, a marketing society should be organised at each of the 2000 mandies in the country. It appeared that no planned efforts were made to implement this recommendation. In 1951 when the All India Rural Credit Survey was carried out, it was observed that out of 75 districts selected

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6. All India Rural Credit Survey Report - Vol. II - P. 105.

for the survey, there was no cooperative marketing in as many as 62 districts. Out of the remaining 12 districts, the share of cooperatives in marketing of agricultural produce exceeded one per cent of the total sales to all agencies in only 5 districts. The overall situation was described by the Rural Credit Survey Committee as follows:-

> "A very - very few - fairly successful cooperative marketing societies do dixst in India; some of these may be significant pointers to the lined on which future progress is possible but, as at present contribution towards bringing about a system in which marketing is by the cultivator and for the cultivator, the part which they occupy in the total picture is wholly insignificant. All the cooperative marketing societies in India put together still fail to catch one's attention as anything important, lacking in this respect even that purely numerical impressiveness which on paper credit societies manage to marshal between themselves".

Development under Five Year Plans:

In the First Five Year Plan, the need for the development of cooperative marketing side by side with cooperative credit was emphasised. However, no specific targets in this regard were laid down and consequently there was no planned effort to strengthen or expand cooperative marketing in the First Plan period. In the meantime, the Rural Credit Survey Report drew pointed attention to the fact that "often enough, the cultivator's position is that of having to bargain, if he can, with someone who can command the money, commands the credit, commands the market and commands the transport".[8] The Report stressed the need for cooperative marketing societies at various levels. It also recommended financial assistance to cooperative marketing societies at the initial stages. Such assistance was to cover State participation in the share capital, loan and subsidy for godowns and subsidy for managerial staff.

In pursuance of the recommendations of the Rural Credit Survey Report, considerable emphasis was laid on the development of cooperative marketing in the Second Five Year Plan. The planning

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9 In pursuance of the recommendations of the Rural Credit Survey Report, considerable emphasis was laid on the development of cooperative marketing in the Second Five Year Plan. The Planning

Commission observed:

> "The primary consideration for the development of agricultural marketing is so to reorganise the existing system as to secure for the farmer his due share of the price paid by the consumer and subserve the needs of planned development. To achieve these objects, malpractices associated with buying and selling of agricultural produce have to be eliminated, arrangements made for the efficient distribution of marketable surpluses from producing to consuming areas and cooperative marketing developed to the maximum extent possible. Rural marketing and finance have to be integrated through the development of marketing and processing on cooperative lines".[9]

2. Under the Second Five Year Plan a network of primary marketing societies was established. Against a target of 1800 marketing societies, as many as 1869 societies were organised/reorganised and State partnered under the Second Plan. This programme has been further continued in the Third Plan and 320 new primary marketing societies are likely to be added by the end of the Plan. It is thus expected that by the end of Third Plan all important secondary markets would be covered by marketing societies. Apart from these territorially organised marketing societies, there are also over 500 specialised commodity marketing societies dealing in cotton, arecanut, coconut, fruit and vegetables, tobacco etc.

3. Along with the development of the structure at the primary level, the higher tiers of cooperative marketing structure were also built up under the Five Year Plans. The higher tiers now consist of about 152 district level marketing societies, 21 State marketing societies, one State Fruit & Vegetable Federation and one State Arecanut Marketing Society. At the All-India level, there is a National Agricultural Cooperative Marketing Federation.

3. As in the case of cooperative marketing structure, the development of agricultural marketing operations by cooperatives is a relatively recent activity. During the First Plan, there was practically no expansion in the volume of agricultural marketing operations. It is only from the beginning of the Second Plan that marketing operations were developed.

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9. Second Five Year Plan - P. 276.

Cooperative marketing of agricultural produce is being undertaken by various types of cooperatives such as primary marketing societies, district and State level cooperatives. Processing societies are another important agency. In some areas, even primary agricultural credit societies undertake sale of agricultural produce either as agents or owners. The following table indicates the progress of marketing of agricultural produce by various types of cooperatives:-

Year		Value of agricultural produce marketed (Rs. in crores)
1950 - 51	..	47
1955 - 56	..	53
1960 - 61	..	179
1963 - 64	..	224
1964 - 65	..	299

The following table indicates the commodity-wise break-up of the value of agricultural produce marketed by cooperatives during the year 1963-64 and 1964-65.

Commodity	(Rs. in crores) 1963-64	1964-65
1. Foodgrains	40.00	99.14
2. Sugarcane	98.71	114.35
3. Other crops	85.05	85.34
	223.76	298.84

Among the cash crops, sugarcane constitutes the single largest commodity accounting for Rs. 114 crores during the year 1964-65, in the total value of agricultural produce marketed by cooperatives. Sugarcane supply societies mostly located in Uttar Pradesh, Bihar and Punjab have marketed sugarcane of the value of Rs. 74 crores. This was facilitated by the Cane Acts which make it obligatory on the part of the private sugar factories in these three States to purchase their sugarcane requirements through these societies.

38 Among the other cash crops handled by cooperatives, mention may be made of cotton, groundnut and certain plantation crops such as arecanut, cocoanut, cashewnut etc. The value of these crops marketed by cooperatives was Rs. 85.34 crores during 1964-65. In the field of cotton marketing, it is estimated that the value of cotton marketed by cooperatives amounted to Rs.26 crores during 1964-65. The share of cooperatives in the marketing of cotton was nearly 14% during 1964-65. Gujarat has recorded remarkable progress in the field of cooperative marketing of cotton. Cooperatives have accounted for nearly 35% of the total production of cotton in that State. In certain areas of Gujarat, a major portion of cotton is marketed by cooperatives. In the cotton zone comprising Surat and Broach districts and Sinor Mahal of Baroda district, over 3/4th of the cotton produced was sold through cooperatives.

39 Cooperative marketing societies have also made significant progress in the marketing of plantation crops such as arecanut, cocoanut, cashewnut, cardamon, pepper etc. This activity is mainly concentrated in the States of Mysore and Kerala. The total value of plantation crops handled by cooperatives is expected to be of the order of Rs. 8 crores during 1964-65. In regard to arecanut, about 12% of the total marketed surplus of arecanut in the State is handled by cooperatives. Cooperatives have also made some progress in respect of other plantation crops such as cocoanut, cardamon, pepper etc.

The progress in the field of cooperative marketing of foodgrains has been limited upto 1963-64. The following table indicates the slow though upward trend in the past few years:-

Year		Value (Rs. in crores)
1958 - 59	..	10.5
1959 - 60	..	24.0
1960 - 61	..	32.0
1962 - 63	..	32.0
1963 - 64	..	40.0
1964 - 65	..	99.0

Marketing of foodgrains by cooperatives was taken up on a priority basis during 1964-65. A number of measures were taken to develop cooperative marketing of foodgrains in 1964-65. These were largely connected with State trading and procurement by government in different States. In Maharashtra, the State government undertook monopoly procurement of jowar through the apex marketing society. In Assam, monopoly procurement of paddy through cooperatives was undertaken. In Madras, Madhya Pradesh, Mysore and Punjab cooperatives were employed in varying extent as agents for procurement of foodgrains. The result of these measures was that the value of foodgrains handled by cooperatives rose to Rs. 99 crores during 1964-65. During 1965-66, a number of steps are being taken to further develop marketing of food grains. The cooperatives are expected to play a substantial role as agents of the Food Corporation of India/State Governments. It is expected that during 1965-66, foodgrains of the value of Rs. 200 crores will be handled by cooperatives.

Considerable emphasis has been laid on the development of cooperative marketing in an intensive manner in I.A.D.P. districts. At the inception of the programme, the number of marketing societies was 204 only. It increased to 250 at the end of June, 1964. Out of a total of 243 secondary markets, with the exception of 3 (2 in Alleppey and 1 in Burdwan), all the other have been covered by a marketing society. The total membership of marketing societies has increased from 1.35 lakhs to 1.79 lakhs. The bulk of the increase was accounted for by Thanjavur, Ludhiana, Burdwan, Raipur and Mandya districts. The cooperative marketing of agricultural produce in all these districts which was annually of the order of Rs. 288 lakhs at the inception of the programme increased to Rs. 809 lakhs during the year ending June 1964. Thanjavur, Raipur, Mandya, Surat and Sambalpur districts have made substantial progress in this regard.

Assessment of Progress:

The Third Five Year Plan envisaged that in the final year of the Plan cooperatives should handle agricultural produce worth about Rs. 400 crores. This target is likely to be accomplished. However, the contribution to the accomplishment of this target is likely to be extremely uneven between different States. A statement showing the value of agricultural produce marketed in different States in 1964-65 is at Appendix I. From this Appendix it will be observed that while sizeable progress has been registered in some States, cooperative marketing is rather limping in several other areas. To some extent it is a reflection of the weakness of the corresponding cooperative credit structure.

Apart from the aggregate, another way of looking at the performance in this field is to assess the overall picture in relation to individual societies. The figures for the latest year are not available. However, in 1963-64, out of the total 2260 marketing societies, 609 marketing societies handled produce worth over Rs. 5 lakhs each, 640 societies handled agricultural produce worth between Rs. 1 lakh and Rs. 5 lakhs each, while 1011 marketing societies handled produce worth less than Rs. 1 lakh each.

III.

PROBLEMS OF COOPERATIVE MARKETING

Operational Problems:

It has to be recognised that cooperative marketing societies in India are comparatively of recent origin and generally they have not had much time to establish themselves on a firm footing. Moreover, they have to compete against strong vested interests. It is noteworthy that, while cooperative credit can expand in absolute terms without necessarily involving a diminution in the volume of private money lenders' credit, cooperative marketing, by and large,

can expand only at the expense of the private trade. It is, therefore, not surprising that while cooperative endeavour in every field encounters vested interests, the opposition to any measures which may facilitate cooperative marketing is particularly strong.

To begin with, cooperative marketing institutions have to function within the framework of the general agricultural marketing structure. For a variety of reasons, this structure is not uniform throughout the country. There are three broad sets of arrangements prevalent in the country. The first set of arrangements is to be found in some of the northern States, particularly in Punjab, Uttar Pradesh, Rajasthan and Madhya Pradesh. These are areas where well-established secondary m rkets have come up and a system of katcha arhatiyas operates. The second set of arrangements is to be found primarily in the jute growing States of West Bengal, Assam, Orissa and Bihar where, in many areas, secondary markets are of no great importance from the point of view of the primary producer who parts with his crop in his own village to an itinerant merchant or in the neighbouring weekly or bi-weekly hat. The third set of arrangements relate to plantation crop areas such as Kerala which have characteristic problems of their own. In between these three sets of arrangements there are several border line situations. In any case, cooperative marketing institutions, in order to attract the growers, have to evolve policies and practices which take full cognizance of the prevailing marketing arrangements. In other words, in the field of cooperative marketing, broadly speaking, it is difficult to prescribe all-India practices and policies.

A crucial handicap in the field of cooperative agricultural marketing has been the lack of support and guidance to primary marketing societies from higher tiers. Most of the apex marketing societies too, are comparatively of recent origin. At present, there is one apex society in every State as well as in almost every Union

The rest came into being during the First/Second Plan periods. Thus unlike the State Cooperative Banks, State Cooperative marketing societies have not had much time to gain the necessary experience. The National Cooperative Development Corporation has recently sponsored a scheme under which apex marketing societies are being assisted to create suitable cells for rendering promotional and advisory service to their member societies. This scheme should help the apex marketing societies to play an effective role in the development of cooperative marketing at the primary level.

Another handicap has been the preoccupation of marketing societies with supply and distribution functions. In many areas, marketing cooperatives are the sole distributors of chemical fertilizers. Some of them have a sizeable turnover in supplying agricultural needs like seeds, implements and pesticides and also consumer articles in rural areas. Thus the resources and attention of their managerial personnel were largely taken up with supply and distribution functions. This naturally resulted in indifferent attention being paid to development of agricultural marketing. In fact, until very recently, the annual statistics about the turnover of marketing societies did not make a distinction between the distributive and marketing functions.

To strengthen the financial position of marketing societies and to enable them to maintain necessary managerial staff and construct godowns, financial assistance has been made available by Government. One of the principal requirements of marketing cooperatives is short-term marketing finance. In recent years, considerable thought has been given to this subject and in particular the State Bank of India has started playing an increasing role in this field. During 1964-65 the State Bank of India sanctioned limits to marketing cooperatives to the extent of Rs. 158.73 lakhs. The State Bank of India also sanctioned limits during 1964-65 to the State Cooperative Banks of Andhra Pradesh, Assam, Madhya Pradesh, Madras, Mysore and Kerala for financing normal operations of marketing/processing societies to the extent of Rs. 12.35 crores and for financing food-grains procurement and distribution

operations to the extent of Rs. 13.50 crores. Despite these developments, lack of adequate financial accommodation continued to be an inhibiting factor in a number of cases.

Another set of limitation of marketing cooperatives relate to their trading practices. To get the grower the best price, cooperative marketing has to include processes such as grading, pooling and bulking of the produce (and processing where necessary) and finally to arrange for their sale in the most favourable markets. Such a system envisages that the produce brought in by an individual grower would be sorted out into separate grades and that he would be given certain amount of money as an advance price. The produce of each grade would then be pooled and processed and finally disposed of in the most favourable market over a period of time. At the end of the period, the grower is paid back the average pooled price based on the gross earnings in respect of each grade minus the necessary incidental and handling charges by the cooperatives. Such practice of pooling has been adopted with a considerable measure of success by cotton cooperatives in Gujarat. This system has been the obvious merit of ensuring that the marketing cooperative as an institution does not undertake any undue risk. At the same time, it enables the marketing cooperative to negotiate for a good price in the most favourable market on the basis of large quantities.

The above system of grading and pooling cannot be adopted by all the marketing cooperatives with immediate effect. In the first place, most of the marketing cooperatives are not equipped to undertake grading of agricultural produce brought by the members. In the second place, in many areas, an average grower is accustomed to selling his produce in the mandi against immediate payment. To quote Mehta Committee on Cooperative Credit:

> "The practices and methods (of marketing cooperatives) are often out of tune with the general prevalent trade conditions so that they are not in a position to offer sufficient

operating in the villages who either arrange for the transport of their produce to the mandis or even purchase the produce in the villages .....: Producers with a small surplus produce will more often be inclined to sell the produce outright rather than entrust to the marketing society for sale on an agency basis. At present marketing societies undertake the sale of members' produce only as agents, charging a commission for their services. If their bye-laws provide for outright purchases of members' produce, such purchases can be only to a limited extent usually not exceeding the paid-up capital. The limit is generally low and prevents the societies from helping many small producers who would like to sell their produce outright".[10]

Recently, a scheme has been sanctioned for enabling marketing and processing cooperatives to enlarge their operations in regard to outright purchases of agricultural produce. Under this scheme, cooperatives are eligible for a contribution to a price fluctuation fund at the rate of 2% of the value of agricultural produce purchased by them outright from their members or from members of affiliated village societies. It is contemplated that in due course this scheme should enable the small grower to come within the fold of cooperative marketing structure.

Finally, a word about the problems of the personnel for cooperative marketing. It is necessary for cooperative marketing societies to be manned by persons who have specialised knowledge of marketing techniques as well as familiarity with cooperative methods of work. This requires not only arrangements for training but also building up of a pool of personnel within the cooperative marketing structure. With this end in view, it is proposed that, under the Fourth Five Year Plan, every apex marketing society will try to create a pool of personnel for being trained and loaned out to their affiliated societies. In due course, this pool can grow into a common cadre. In the meantime, the Committee for Cooperative Training, set up under the National Cooperative Union of India, is examining the measures necessary for reorientation of the existing arrangements for the special course in cooperative marketing conducted by the Committee at their Training Centres in Indore, Madras and Poona.

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10. Report of the Committee on Cooperative Credit -- P.171-172.

Problems of Coordination and Administration:

During the last three decades, several changes have taken place in the pattern of sales of agricultural produce in the country. The development of cooperative marketing, legislation for standardisation of weights and measures, setting up of warehousing corporations, regulation of forward trading, the awareness of the need for establishment of regulated markets on the one hand, extension of grading services, extension work and dessimination of market intelligence on the other, have helped in providing favourable environment for producers to obtain better returns. The administrative set up concerned with the development of marketing in the Centre and in the States is presently concerned only with providing marketing services like administration of regulation of markets and supervision of grading. Separate agencies have been setup for the administration of warehouses, weights and measures, forward markets, cooperative marketing etc. The programme of marketing, processing and storage are complementary to each other and have the common objective of improving the economic conditions of the farmer. The pace of development in regard to these activities has not been sufficiently fast and uniform in all the States. Due to the multiplicity of organisations administering different aspects of the programmes, each pursuing its own isolated pattern of development, the impact of these programmes on the rural economy in general has not been very significant. It is, therefore, necessary to ensure a closer liaison between the various official agencies concerned with the development of marketing, processing and storage not only at the Central and State levels but also at the district and market levels in order to forge an integrated approach to the implementation of programmes in these fields.

At the Central level, the following organs of government are directly or indirectly concerned with the programme of marketing, processing and storage:-

1. Ministry of Food and Agriculture:

(a) Department of Agriculture:

i) Directorate of Marketing & Inspection
ii) I.C.A.R. and its Commodity Committees
iii) Extension Directorate (Inspection & Storage in I.A.D.P. and I.A.A. districts)

(b) Department of Food:

i) Storage Division in the Department
ii) Food & Nutrition Board
iii) Central Warehousing Corporation
iv) Food Corporation of India.

2. Ministry of Community Development & Cooperation:

i) Department of Cooperation

ii) National Cooperative Development Corporation.

3. Department of Supply & Technical Development:

i) Directorate General of Technical Development

ii) Development Council for Food Industries.

For ensuring coordination at the Central level, there is, at present, a small Committee constituted by the Department of Agriculture consisting of representatives from that Department, Central Warehousing Corporation, and the Department of Cooperation. Neither the composition of the Committee nor its work, so far, indicate the possibility if its being able to ensure an integrated approach to the problems of marketing, processing and storage.

The pattern of organisational arrangements in the State Governments for the administration of these programmes differs from State to State. In one or two States, there is a separate Director of Agricultural Marketing of the status of a head of a Department. But in most other states, the work relating to agricultural marketing is handled in a division under the control of the Director of Agriculture or the Registrar of Cooperative Societies.

At the Secretariat level also, there are several variations. Apart from these Directorates/Departments/Divisions within the State Governments, there are other agencies also concerned with these programmes:-

(1) State Warehousing Corporations

(2) Registrars of Cooperative Societies

(3) Regional Directorates of Food of the Department of Food or the Food Corporation of India as the case may be.

There does not appear to be adequate coordination between these agencies at the State level.

For the promotion of the programme of cooperative processing almost all the States have constituted high-level committees under the Chairmanship of the Minister in charge of Cooperation. The other members of the Committee are usually Ministers and heads of other concerned Departments such as Industries, Agriculture, Cooperation, Finance etc. The main function of these committees is to plan and promote the programme of cooperative processing on a sound basis.

At the district level, the district officers in charge of Agriculture and Cooperation are generally concerned with these programmes. Apart from this the Zilla Parishads have a vital role to play in the development of these activities. No satisfactory arrangements for coordination of these activities at the district level have so far been evolved. At the market level, however, in a majority of the States, there is provision for a representative of the cooperative marketing society to be nominated on the regulated market committee.

It has been observed that in the States of Maharashtra, Mysore and Orissa where the Registrar of Cooperative Societies is also the incharge of agricultural marketing, the coordination between the Agricultural Marketing Department and the Cooperative Department had been possible to a large extent. This arrangement could be considered by other State Governments also.

Problems of linking marketing with credit:

Linking of cooperative marketing with cooperative credit has been recognised as an integral feature of the programme of cooperative

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production credit to the members on the basis of the crops grown by them and arrange for the recovery from the sale proceeds of the respective crops. For this purpose the borrowing members should sign a bond undertaking to sell their crops through the concerned marketing society which would be authorised to make recovery of the instalments from the sale proceeds.

For effective linking of credit with marketing one of the requisites is establishment of an organic link between credit institutions and marketing societies. In recent years there has been considerable progress in affiliating primary credit societies to marketing cooperatives. While in 1955-56, 6385 societies out of 159939 village societies were affiliated to marketing societies, the corresponding position in 1965 is that out of 209841 village societies, 125135 societies have been affiliated. In other words, the percentage of affiliated village societies has risen from about 3.5% to about 60%. On the operational side also some progress has been registered. During 1964-65, it is estimated that nearly Rs. 30 crores of production credit advanced by village societies was recovered from the sale proceeds in respect of agricultural produce marketed by cooperatives. This recovery accounts for approximately 10% of the total loans recovered during the year. The performance in this respect is considerably uneven in different States. The cotton marketing and processing societies in Gujarat and cooperative sugar factories in Maharashtara, foodgrains marketing societies in Uttar Pradesh have shown significant achievement in forging an effective link between credit and marketing. In other areas, effective steps in this direction have still to be taken.

One of the pre-requisites for forging an effective link between cooperative credit and cooperative marketing is that the concerned institutions in both the sectors should develop the level of business operations and competence of a sufficiently high order.

In areas where cooperative credit itself is not well developed, cooperative marketing is inhibited. Similarly, where cooperative marketing institutions are not well-developed, any effective linkage between credit and marketing is not easily possible. Apart from institutional growth, the linkage will also require development of suitable procedures and also provision of requisite incentives and disincentives to individual borrowers. It would also be necessary to involve the concerned central cooperative banks in this process. Finally, as a strategy, it might be desirable to introduce compulsory linkage for a percentage of the loan, the percentage being determined for each area locally by the concerned non-official and official workers in charge of cooperative credit and marketing institutions.

IV.

CONCLUSIONS AND RECOMMENDATIONS

Under the Fourth Plan, the intention is to develop the marketing operations of cooperatives to the extent that is necessary to enable them to exercise wholesome influence on the pattern of agricultural trade. The future targets in relation to cooperative marketing of agricultural produce are set forth in the table below:-

	(Value - Rs. in crores) At the end of 1970-71. (targetted scale)
1. Foodgrains ..	400
2. Sugarcane ..	200
3. Cotton ..	110
4. Groundnut ..	80
5. Specified plantation crops (arecanut, cocoanut, cashewnut, pepper ginger, cardamon) ..	18
6. Other crops ..	42
Total	[illegible]

For the accomplishment of the above task, concerted measures to tackle the various problems outlined earlier will be necessary.

In particular, it is imperative to attend to problems of marketing personnel and marketing finance. The finance required is estimated to be of the order of Rs. 200 crores. The State Bank of India and other concerned agencies have to play a very significant part in providing the funds.

Apart from the strengthening and the development of cooperative marketing structure in the aggregate, it will be necessary for individual societies to develop competence and expertise taking into account the local market conditions and the commodities to be handled. In the development of such competence higher tiers of cooperative marketing structure must provide guidelines to their affiliated organisations.

During the course of the Fourth Plan the strategy of development of agriculture envisages intensive development of particular crops in selected areas. This development will need to be correlated to provision of suitable marketing and processing facilities in the cooperative sector. For instance, in areas where intensive blocks for groundnut cultivation have been organised, it would be necessary to develop cooperative organisations for the marketing and processing of groundnut. Similar development of cooperative marketing and processing facilities will be necessary in areas selected for intensive cultivation of cotton. The same kind of perspective planning will be necessary to even larger extent in the case of areas selected for intensive fruit and vegetable cultivation.

Finally, it must be stressed that in order to implement effectively the various schemes concerned with the promotion and growth of cooperative marketing institutions, the closest liaison must be developed between official agencies connected with the development

of cooperative marketing and storage not only at the Central and State level but also at the district and market levels, with a view to forge an intengrated approach. This will require effective functioning of suitable coordination committees at the Central and State levels as also at the level of the Zilla Parishads and individual mandis.

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APPENDIX I

VALUE OF AGRICULTURAL PRODUCE MARKETED BY CO-OPERATIVES DURING 1964-65.

(Rs. in Lakhs)

State	Marketing Societies Primary	Marketing Societies Central	Sugar-cane supply Societies	Cooperative Sugar Factories	Cotton Ginning & Pressing Societies.	Other Processing Societies	Primary Agricultural credit Societies	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Andhra Pradesh	79.41	318.84	-	332.57	-	-	23.43	754.25
Assam	1564.51*	1.20	-	23.90	0.34	68.00	172.49	1830.44
Bihar	50.80	-	550.75	-	-	-	-	601.55
Gujarat	1012.95	63.42	-	211.81	1589.43	14.77	558.48	3450.86
Jammu & Kashmir	11.58	3.89	-	-	-	-	67.00	82.47
Kerala	275.07	42.16	-	71.38	-	19.01	55.56	463.18
Madhya Pradesh	935.87	-	-	-	44.89	-	26.70	1007.46
Madras	1639.00	XX	-	360.00	-	-	-	1999.00
Maharashtra	3050.00	600.00	7.00	2118.00	70.00	75.00	480.00	6400.00
Mysore	1326.46	175.87	-	375.33	18.02	N.A.	117.27	2012.95
Orissa	54.30	-	-	27.23	-	70.58	0.49	152.60
Punjab	1200.00	-	305.00	287.28	52.59	113.00	N.A.	1957.87
Rajasthan	150.00	-	-	-	-	2.00	4.00	156.00
Uttar Pradesh	1472.78	225.00	6681.78	265.88	-	11.00	-	8656.44
West Bengal @	224.02	XX	-	-	-	1.81	24.88	250.71
Union Territories	70.00	130.00	-	-	-	15.00	75.00	290.00
Total for 1964-65.	13116.75	1560.38	7544.53	4073.38	1775.27	390.17	1605.30	30065.78
Total for 1963-64.	8143.85	1061.99	6436.59	3434.09	1908.93	120.79	1269.77	22376.01

* Includes direct operations of Apex Marketing Society under paddy procurement scheme.
@ Tentative.
XX Included under primary marketing societies.

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For Participants Only

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SEMINAR
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AGRICULTURAL ADMINISTRATION

(March 9-12, 1966)

THE INTENSIVE AGRICULTURAL DISTRICT PROGRAMME

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THE INTENSIVE AGRICULTURAL DISTRICT PROGRAMME AND PUBLIC ADMINISTRATION*

Some Lessons Learned in the Package Programme for Agricultural Development

1. INTRODUCTION

The Intensive Agricultural District Programme (IADP), which is now completing its fifth year, is operating in 15 of India's 325 districts. Approximately a million of the nation's 50 more than million cultivators are taking part in it.

IADP is a government programme which demonstrates a coordinated "package" of related practices to cultivators as the quickest and most effective way to raise their yields and income. These practices include using better seeds, treating seeds to protect them from disease, using improved farm tools, the right amount of fertilizers at the right time, and taking suitable plant protection measures. The package varies according to local conditions, but it always includes a combination of interacting, scientific, farming practices.

It is generally recognized that IADP, popularly called the "Package Programme", has pioneered new concepts and methods of agricultural development. What is not so well-known is that it also has pioneered in both agricultural and public administration.

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*The material in this paper was prepared in the Ford Foundation office of the Intensive Agricultural District Programme. It is based largely on evaluation reports, recommendations of special IADP Conferences, and special reports by Foundation consultants.

The lessons Package Programme staffs are learning are vital to India today as it strives to become self-sufficient in food production. The value of this Package Programme experience is underscored by the government's decision to expand the package concept to more than 100 districts during the Fourth Plan in what is known as the IAA (Intensive Agricultural Areas) Programme.

IADP experience has demonstrated how improved administration can advance agriculture. But unresolved administrative difficulties still handicap agricultural production and compound the nation's food difficulties.

This seminar on "Administrative Aspects of Agricultural Development" will concentrate on the following four aspects: planning for agricultural development; agricultural extension; programme administration; and union-state-field agricultural relationships. This paper is chiefly concerned with programme administration.

Package Programme experience indicates that agricultural extension methods alone are not the most effective way of working with Indian farmer The programme is now organized around an education-cum-action approach at the district operating level which is essential for the extensive, fast-moving kind of programme India needs.

Although India's crop yields are among the world's lowest, the country can increase its food production considerably. India is a potentially productive land. Its water resources can be exploited more fully and managed more efficiently. Research is underway on promising new

crop varieties. Farmers are using more and more chemical fertilizers and other essential inputs. Moreover, the country is moving toward effective national price policies which offer cultivators the incentive to increase their food production. Finally, India has many millions of cultivators who are more than ready for improved farming.

But all this is not enough, as India's continuing agricultural crises have shown to date. Specialists in all fields tend to feel that if their speciality can be emphasized, the agricultural problem will be solved. But quite clearly this is not the answer. First and foremost, it is essential to have an effective administration at all three centre, state, and district levels.

The five-year-old Package Programme has followed the centre-state-district line of administration. But its most important contribution has been to build an administrative structure for this integrated programme at the district rather than the block level where many individual agricultural schemes have been implemented.

The IADP district staff is headed by a Project Officer with a staff of Agricultural specialists and a deputy registrar of cooperatives whose responsibilities are chiefly concerned with the Package Programme.

The important difference between the District Project Officer and the District Agricultural Officer is that instead of dealing mainly with technical problems, the Project Officer is a planner, and organizer, and the leader of an intensive agricultural development programme.

On balance, Package Programme administration has been successful enough to confirm the initial belief in the effectiveness of this approach. But it has encountered enough difficulties to show that steps must be taken to clear up these problems, if the full potential of the programme is to be realized.

This review will stress the problems and lessons learned, in the firm belief that these problems must be solved if Indian agricultural development is to progress satisfactorily. The successes are apparent. But administrative obstacles will continue to slow down progress unless the necessary changes are expedited.

A single administrative problem may not be large or overwhelming. But when a whole series of them are encountered in the administration of a single programme such as IADP the cumulative effect is discouraging.

The Package Programme administration to date has effectively demonstrated how to organize such and implement such an intensive agricultural programme. Many officials concerned with it now know what the requirements are for administering such a programme. But they have not been in a position to master some of the key factors requisite for successful public administration.

The programme following review indicates the procedures which were followed in organizing and implementing it and some of the difficulties which were encountered both in the substantive and administrative areas.

II. THE GENESIS OF THE PROGRAMME

The Indian Government asked the Ford Foundation to bring an agricultural production team from the United States to India in 1959 to help review its agricultural policies and progress.

The team's report, "India's Food Crisis and Steps to Meet It", pointed out that the gap between production and food needs would grow unless a programme was undertaken at once to increase food production substantially. It recommended an all-out effort to increase food production which would concentrate scarce resources in the more favourable agricultural areas. The aim was to obtain maximum returns from limited technical personnel and scarce food production resources.

The Indian Government accepted the team's recommendations and asked the Foundation to help work out such a concentrated, intensive agricultural programme.

A second Foundation team came to India in October 1959 and helped Indian officials develop the Intensive Agricultural District Programme. The programme later became known as the Package Programme.

Actually, the term "package" includes both an on-the farm package of scientific practices and an off-the-farm package of related services such as adequate storage, credit and marketing facilities.

Objectives of the Package Programme

IADP was set up to fill the most obvious gap in India's agricultural development - the need to reach farmers with improved technical knowledge where conditions were most favourable for them.

It also had the four-fold purpose of:

1. Finding out how rapid increases in food production could be obtained and applied to the rest of the country.
2. Increasing cultivator's income.
3. Improving village economic resources.
4. Providing an adequate agricultural base for more rapid nationwide economic development and social betterment.

Ten points of the programme set up to carry out these objectives were:

1. Enough readily available supplies for cultivators.
2. Adequate farm credit
3. An intensive educational programme
4. Simple farm plans for individual cultivators
5. Stronger village institutions
6. Assured price incentives
7. Reliable marketing facilities
8. Rural Public Works
9. Evaluation and analysis
10. Coordinated approach

Seven districts were chosen to launch the programme in 1960. The basic criteria used in selecting them was whether or not they had:

1. organized and experienced Community Development and extension service systems;
2. local service cooperatives capable of extending the required amount of production credit, distributing supplies and assisting with marketing;
3. sufficient irrigation to supplement natural rainfall along with soil fertile enough to make intensive production efforts economically feasible;
4. sufficient roads and other means of communications;
5. enough scientifically developed and tested improved farm technology to bring about substantial and profitable increases in yields when it was applied by cultivators.

The districts chosen were: Thanjavur(Madras); West Godavari(Andhra Pradesh); Shahabad(Bihar); Raipur(Madhya Pradesh); Aligarh(Uttar Pradesh); Ludhiana(Punjab); Pali (Rajasthan).

Four districts are chiefly rice-growing ones, two are largely wheat producing, and the seventh grows equal amounts of both wheat and millets.

A year later the government decided to expand the programme to one district in each of the remaining states in the country. The Foundation agreed to provide additional consultant services after meeting the needs of the original seven districts. In practice, IADP included 15 districts and Ford Foundation consultants worked with all 15 to the fullest extent possible.

The eight additional districts were: Alleppey(Kerala); Bhandara (Maharashtra); Burdwan(West Bengal); Cachar(Assam); Mandya(Mysore); Palghat (Kerala); Sambalpur(Orissa); and Surat(Gujarat).

The Ford Foundation provided approximately $11 million for the initial five-year period in the original seven IADP districts. These funds paid half the additional staff costs, helped finance demonstrations and training, buy transport and demonstration equipment, set up soil testing laboratories, workshops and district information units, and helped finance research and evaluation. The central and state governments met the remaining costs.

The Foundation also provided a team of cousultants who were specialists in farm management, marketing and supplies, credit, soil, crops, water, farm implements and power, poultry and livestock, plant protection, information and communications.

The US-AID Mission to India and the Rockefeller Foundation also are assisted in important aspects of the programme.

The government has taken some significant organizational steps to carry the programme forward. It has established new positions and built up the required staffs. At the district level a Project Officer, working under the collector, has been put in charge of the programme. He is assisted by four or five agricultural specialists and an assistant or deputy registrar of cooperative societies.

Three or four agricultural extension officers and one cooperative extension officer were added to Community Development block staffs. The number of Village Level Workers was increased from an average 10 to 20. Each one was given a maximum of five villages to work with instead of the usual 10.

The Ministry of Food and Agriculture is responsible for the administration of the programme at the centre. There is a project officer in charge who is assisted by a corps of specialists. They provide overall direction, guidance and cooperation. State governments are responsible for carrying out the programme on the field.

The central government plays two important roles. First, it must create favourable conditions for rapid agricultural development including a price policy which provides incentive to cultivators, ample technical supplies and production credit. Secondly, it must provide energetic and effective direction and leadership and it must analyze and evaluate the programme constantly. Although state governments are responsible for implementing it in the field, IADP is national in concept. It will not succeed unless the various states and districts move forward together. This calls for strong central government leadership.

Coordinating Committees were used to facilitate administration. The Inter-Ministries Working Group is a central coordinating body in which the interests of various agencies are represented. Its membership has included representatives of the Department of Agriculture; Ministry of Community Development, Panchayati Raj and Cooperation; Ministry of Finance; Ministry of Irrigation and Power; Planning Commission; and the Reserve Bank of India, all under the overall Chairmanship of the Special Secretary in the Department of Agriculture. Similar coordinative groups have been established in States and districts.

III. IMPLEMENTING THE PROGRAMME

Each district had to create its own programme which then had to be explained to cultivators. An individual farm plan had to be prepared for each cultivator taking part in the programme in the district. At the same time, adequate fertilizer had to be supplied and distributed, godowns built, credit extended, equipment demonstrated, and a number of modern agricultural techniques started almost simultaneously. It was an enormous undertaking.

IADP is quite different from previous agricultural development schemes. It is an integrated programme with the various elements of improved technology concentrated into a single "package" of scientific practices which are designed to show the cultivator how to grow more food.

It is important to note that IADP is a total, all-out agricultural effort applied at the local (district) level. It is not just another agricultural development scheme which deals with some single phase of the problem. It deals simultaneously with informal education for farm people, applying modern farming technology, intensifying the use of agricultural resources, creating effective local agricultural institutions, and organizing of all of these things, and more, into a fast-moving programme which builds up progressively as it moves along.

The necessary supporting services put into effect as the programme got underway were: adequate and timely credit; sufficient supplies of seeds, fertilizers, pesticides and improved farm tools; suitable transportation and marketing arrangements; expanded storage facilities; an intensive educational programme based on field demonstrations and technical information units; facilities for testing soil and seeds; and farm tool workshops.

The programme relied heavily on field demonstrations to educate cultivators in new package practices. Demonstrations usually were carried out on a cultivator's field covering an acre, or less, which was divided into two plots. On one the crop was grown according to recommended Package practices. On the other the usual traditional, local methods were used. These contrasting demonstration plots were established in nearly all Package district villages. Cultivators could see for themselves the difference in yields. These demonstrations showed an average return of two rupees or more for each additional rupee cultivators inverted in package programme practice.

As IADP has advanced, the size of demonstration plots has gradually increased. Small two-part plots have been replaced in many villages with large ones covering an entire field, a whole farm, a combination of several farms, or even a whole village. No control plot is used in these large demonstrations because cultivators automatically compare their own fields with them. These large demonstration plots were found to have far more impact on cultivators than the small, two-part ones, especially after the programme had been in effect for a few years.

Training has been a pressing, and continuing, need right from the start. The Project Officer directs a three-part training programme. One part instruct district, block, and village field staffs on policy, programme objectives and the responsibilities of the staff, local leaders, institutions and cultivators. The second part familiarizes them with package practices. This means learning how to carry out the recommended practices and explain them to farmers. The third part shows extension workers how to apply these practices in farmers' fields. In-service training is one of the main reasons for the programme's success.

Continuous training has to be given year afteryear to improve knowledge and skills and to accommodate adjustments in package practices and frequent staff changes. Refresher training also is given to most field-staff workers every year.

There are several methods of gauging IADP progress, although none of them are entirely satisfactory. As time goes on yield figures will tell their own story. Figures for food-grain gains

are complete because detailed data is not readily available for all food grain crops. Short-run yields vary widely with the vagaries of the weather. For example, in one district, the rainfall one year was half the average and another year it was twice the average. Widespread drought this crop year has cut yields considerably in many districts.

The number of farm plans drawn up is one good index of cultivator acceptance of the programme. In 1961, there were only 55,000 farm plans. Last year the number had increased to over a million. A block analysis of the first seven districts showed the average number of participating farmers was 590 the first year of the programme. By the fifth year it was upto 4,580.

The best performance has been in supplying fertilizers, although last year there were shortages in some areas, chiefly in phosphate. The amount of nitrogen fertilizer used last year ranged from 200 to 600 per cent above the amount used in 1961 in the various package districts. The percentage increase in phosphatic fertilizer was even greater.

Amonium sulphate used in the first seven districts rose from 56,876 tons in 1961 to 178,955 tons in 1965. In the eight additional districts where the programme started later, the figures were 45,362 tons in 1962 compared to 108,009 tons in 1965.

Some 20, 609 tons of superphosphate were used in 1961 compared to 90,702 in 1965 in the first seven districts. In the eight added districts, the figure for 1962 was 18,704 tons compared with 44,063 tons in 1965.

An analysis of fertilizers used per block in the first seven districts showed that farmers were using ammonium sulphate and superphosphate fertilizers at the rate of 1,280 tons in the programme's fourth year. The seven states in which these districts were located had a statewide block average (minus the IADP districts) of 540 tons. The All-India block average, (minus IADP districts) was 520 tons.

Experiences in the First Seven Districts

The first seven districts will complete five crop years when the 1966 crop has been harvested. Records are available for them for four crop years. The following table compiled from evaluation reports and other data summarizes the increase in cereal production in the package districts compared with All-India production, and the output in the states where the Package districts are located.

Index of Cereal Production: All-India, seven selected States and IADP Districts in those States.*

Years	TOTAL PRODUCTION		
	All-India (all cereals)	seven states (all cereals)	seven districts (major cereals)
1958-61 (3 Yr.Av.)	100.0	100.0	100.0
1961-62	106.3	108.9	118.6
1962-63	100.5	101.2	108.0
1963-64	106.2	102.4	116.3
1964-65	116.0	113.1	130.4

*Data from evaluation reports and the Directorate of Economics and Statistics, Ministry of Food and Agriculture. One district partly estimated due to lack of benchmark data.

Another indication of the farmers favourable attitude is the increase in plant protection measures. A report at the national conference of key personnel in intensive agriculture in New Delhi in December 1965 showed that for the 15 IADP districts, 985,965 hectares were treated against pests and diseases in 1964 compared with 315,777 hectares in 1962.

IV. LESSONS LEARNED

Results to-date indicate that IADP has succeeded in its main objectives. It has not worked perfectly, but it has shown over a million cultivators new ways of producing more food.

Progress is encouraging enough to warrant an expanded programme although experiences have highlighted certain problems which demand continuing attention if Indian agriculture is to realize its potential.

One striking feature is that the most pressing problems are beyond the control of individual cultivators. They are national or regional problems which involve such essential services as supplies and credit. Teaching new improved methods of producing food to cultivators and persuading them to use these methods is much easier than organizing, say, a timely, continuous supply of fertilizers. It is relatively easy to explain how credit can be used for growing more food. It is much more difficult to evolve a smoothly working credit system which provides cultivators with the right amount of credit at the high time.

Other problems are large enough to require a sustained, national effort.

For example, one is the need to research new high-yielding crop varieties which will stand up under heavy fertilization. Such varieties are now being developed. The new short-strawed Mexican wheats with their Indian adaptations are producing double the customary yields. New paddy varieties such as Taichung Native 1, and others hold out similar possibilities. Research stations must meet this continuing need for better varieties.

Along with this goes the problem of maintaining supplies of genetically pure and viable seeds. In some parts of the country this requires special drying and storage facilities. Many small seed farms have sprung up and a new programme is underway to concentrate seed-production on relatively small farms around a seed-processing plant. Two such seed-processing facilities are going up in Thanjavur and West Godavari districts to demonstrate and test this method for handling the seed supply.

The original IADP programme called for price incentives to motivate and encourage rice and wheat farmers. Positive steps were taken in this direction in 1964. A feasible price incentive policy has now been adopted. It must be administered with enough skill to encourage farmers and still be fair to consumers.

Another problem is better marketing and processing of farm products. A special study of rice mills showed that seven to eight percent more edible rice can be obtained from raw paddy with modern milling methods. Six modern rice mills have been authorized to demonstrate these possibilities.

Progress in developing new tools for such operations as plowing, seeding, and plant protection has created a growing, new, nationwide problem. At first the task was to design and test tools or to import models which could be adapted to Indian conditions. Now the problem is to manufacture this equipment on a mass scale to meet the growing demand. The seed-cum-fertilizer drill is good example. It is especially effective for planting wheat and other small grains. Another is a badly-needed, portable power-sprayer which is in very great demand. Indian manufacturing firms can meet these demands if they have the necessary raw materials and foreign exchange, and if they provide maintenance service.

Supplying farm credit at the right time and then making sure that loans are repaid has proved to be one of the most difficult, and as yet unsolved, problems in the programme. Usually cooperatives are the official source of credit for farmers. The main difficulty has been that most of the cooperatives are far too small. Procedures are often cumbersome. The margins for handling supplies have been fixed at levels that do not induce improved supply service. Finally, collection procedures have been uncertain and overdue amounts have risen, even in the most productive districts.

These are some of the major, substantive problems IADP has encountered. There has been some progress. During the Fourth Plan the Ford Foundation will concentrate its aid to IADP on five districts to help analyze and work out some of these difficulties.

Perhaps the most basic problems are in administration. Improved administrative methods could solve many of them. They are not new problems but they persist stubbornly.

The main administrative problems are recruiting and maintaining stable staffs, devining chains-of-command, delegating authority and coordinating the various phases of the programme. Delays in recruiting and posting staff members and frequent transfers results in inefficient use of manpower.

The programme has been continuously evaluated by the Expert Committee on Assessment and Evaluation in the Ministry of Food and Agriculture. The Committee's "Report on the Intensive Agricultural District Programme 1961-62" put this staffing problem in these words:

"After the receipt of the approval of the Government of India to the appointment of additional staff in various categories at different levels, it took the State Governments considerable time to issue detailed sanctions after consulting their Finance Departments. Procedural delays stood in the way of prompt clearance of sanctions. Even after the issue of sanctions, delays occurred in recruitment and appointment of staff. While the bulk of the staff sanctioned at district level was placed in position during 1960-61, this was not the case with staff sanctioned at block level. Even till the end of 1961-62, the full complement of the block level staff such as AEOs and VLWs was not in position in almost all the districts."

The problem was also found in staffing other phases of the programme. For example, the Evaluation report said "In the case of supporting activities like the establishment of implements workshop, soil testing laboratory, information unit and quality seed programme, the position was still less satisfactory. Here again, recruitment and postings were held up for a long time, with the result that these basic activities, which are intended to strengthen and support the implementation of the Package Programme, could not make satisfactory progress during the years 1960-61 and 1961-62. It was only in 1962-63 that steps were taken by the State Governments to appoint the technical staff approved for these activities. It would, thus, be seen that the programme started with certain handicaps and deficiencies, which, though overcome to a large extent, continued to inhibit progress even till the end of 1962-63."

After the initial recruiting of personnel was finally completed, another problem arose which the original plan for IADP had sought to avoid. Personnel were transferred before maximum use could be made of their training and capabilities. Even key people had to leave their jobs before they had been there long enough to really understand the programme and their relation to farmers resources, institutions and government units under their jurisdiction. A survey in mid-1965 revealed that the average tenure of a district collector in India was 18 months. The district collector is a key man in managing development programmes. In one IADP district there were five collectors in less than five years.

In a study made early last year of the tenure of key personnel in 12 IADP districts it was found that in no district had the same collector remained in position from the start of the programme (which was four-and-a-half years from the starting date of the earliest district to the date of the survey). Six districts had two different collectors and the other six had three or four. This was after the states had agreed to keep key personnel in place for the duration of the programme.

The record for the District Agricultural Project Officers was better. Six of the 12 districts had the same Project Officer from the start. The other six had two or three different ones.

In regard to district agricultural specialists, it was found that most (approximately three fourths) of the districts had kept the same individuals in position. But because of recruiting delays the positions were filled only about three-fourths of the time. A notable exception was the position of district plant-protection specialist which was filled 96 per cent of the time and in seven of the 12 districts by the same individual.

A little over one-half of the BDOs, AEOs and CEOs and 41 per cent of the VLWs had less than two years service in their current positions. It requires one to two years for even the most capable officials to learn enough about the people, their institutions and resources to be able to make any significant contribution to their improvement.

IADP experience with the type of problem outlined has brought on some hard thinking on possible solutions or, at least, ways of lessening the handicaps of present procedures.

On delays in staffing, it has been suggested that key positions could be filled on a temporary basis by qualified people and that subsequently they could be installed on a permanent basis.

On the matter of promotion transfers, lip-service is given to the concept of keeping people in place, but in practice these promotion transfers continue. One recommendation is to promote a person in place and allow him to remain in his line of work in the same district. It is said that this would increase expenses because promotions would take place within the district and other district jobs open outside the district would have to be filled by more promotions. This may be true to a certain extent, but some of this would be cancelled out by a decrease in the number of personnel who would have to be promoted into the district to fill vacancies there. This should be considered part of the increased investment needed to speed progress in agriculture. Even if it does cost more, efficient administration requires that indiscriminate and often arbitrary transfers should be reduced to a minimum.

A proposal which offers some hope of relief is that when a transfer is unavoidable, a successor should be posted and should be in place at least two months before the incumbent leaves the post. This would go a long way towards overcoming the hiatus which occurs when an essential officer is transferred and his post remains vacant for weeks and months, while important work is neglected.

As to operations, administrative control of budget, staff and programme should be delegated to the district. Agricultural development is essentially a local operation at the farm and village

level. It cannot be effectively managed from a state headquarters, no matter how competent the state office may be.

Regarding chains-of-command, there has been a growing demand from the districts that the District Project Officer should have direct authority over the block staffs, that is, over BDOs and VLWs. In practice, if there are sufficiently good personnel relationships, the programme can move forward, but too often this occurs merely by sufference. For an effective programme the Project Officer must have substantial authority over those working on the programme. Frequently, Project Officers have found that VLWs, for example, are ordered to work on non-agricultural projects at a time when agricultural needs are greatest.

A somewhat similar problem arises with regard to collectors. IADP looked to the collector to coordinate the program in each IADP district. For the most part this worked well. When collectors are interested in agricultural development and when they can remain in place long enough to really understand the programme, they can be very effective. Lacking this, necessary authority with the Project Officer is desirable.

This question of chain-of-command received attention at the Central Conference of Key Personnel of Intensive Agricultural Programme at New Delhi in December. One of the working group reports on Administrative and Organizational Matters included the following statement under the heading of "Line of Control".

"It was felt that unless the Agricultural Department exercises effective control over the VLWs and the BDOs, it would not be possible

to use them for agricultural production to the extent desired. The working Group on Inter-Departmental and Institutional Coordination of Agricultural Production had gone into this question and recommended that the Agricultural Extension Officers should initiate the character roll of VLWs and the DAOs should initiate the character roll of BDOs. It was agreed that this recommendation should be implemented wherever it had not been done.

"It was pointed out that in some of the districts like Aligarh the Project Officer exercised control over the district level officers of all departments concerned with agricultural production like the District Animal Husbandry Officer, Soil Conservation Officer, Assistant Registrar of Cooperative Societies, etc. Such an arrangement has contributed greatly to effective coordination and proper supervision. It was recommended that in all Intensive Agricultural Districts the Project Officer should control the concerned technical officers and be given the authority to write their character rolls".

No state as yet puts the district fully in charge of its annual budget. The result, is a continual series of time-consuming efforts and minor frustrations trying to make use of a budget which already has been sanctioned.

A third difficulty has been insufficient delegation of powers to the Project Officers. Even though there was some delegation of authority at the beginning of the programme to expedite the programme, as the programme progressed and became more complex, these powers were inadequate.

The feeling is that more powers should be delegated to District Collectors and Project Officers to: buy current supplies and keep an adequate inventory; create flexibility in operations, keep the staff sufficiently mobile to make field work effective, and manage such units as seed farms, implements workshops, soil-testing laboratories, and district information offices.

Coordination committees have worked satisfactorily when they meet regularly, but some committees meet very infrequently.

Another difficulty with coordination committees, especially in the states, is that even afterdecisions are made, actions must be approved by administrative and finance departments even though these departments are represented on the coordinating committee.

There are numerous other difficulties concerned with transport, incentives, and so on but the ones mentioned above are some which have persistently handicapped the programme and which must somehow be solved.

Along with promotion in place, some other suggestions for staff improvement are greater incentives, not necessarily in terms of money, but in recognition, advanced training, and similar encouragement.

On chain-of-command, the suggestion has been made that the Agricultural Department should be responsible. The decision taken some time ago in Madhya Pradesh to eliminate the post of Block Development Officer and place the agricultural staff under the Agricultural Department is a significant experiment along these lines.

A start toward a more rational delegation of powers is incorporated in a recommendation made at the recent IADP conference in

New Delhi to the effect that the Centre should work out a model of administrative and financial powers to be delegated to the Project Officers and that this model should be circulated for state governments to adopt.

On coordination, the principal recommendation is that meetings of coordination committees should be held at least once every three months and that steps should be taken to carry out decisions promptly.

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Can the Package Programme be extended successfully to other parts of the country?

One answer to this question is the government's decision to extent the package concept to more than 100 of India's 325 districts, even before the programme had completed its initial five-year period, much of India's hopes for substantially increasing food production rest on this new Intensive Agricultural Areas Programme.

IAA will use essentially the same IADP methods although it will be less intensive.

Administratively, it would appear that if the desired principles of centralizing responsibility in an IADP Project Officer, and establishing an effective district organization can be made effective, the IAA programme can succeed. There will be need for large numbers of people possessing actual or potential administrative skill to extend the intensive programme concept to the large number of districts which have been earmarked for the IAA programme. And many of the problems which arose in IADP must be solved if IAA is to produce effective results during the Fourth Plan.

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SEMINAR ON

AGRICULTURAL ADMINISTRATION

(March 9th-12th, 1966)

FOOD GRAIN PRODUCTION & MARKETING

By

S. Satwant Singh
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While the Government has decided that the farmers should get a minimum scheduled price linked with the cost of production. In most of the surplus areas during harvesting period, the grower is forced to part with his produce at a marginal price level. During last decade, these distress foodgrain sales have boom-ranged on surplus production. By cornering its stocks, the foodgrain trade invariably manipulate prices and indulge on a larger scale smuggling on the borders of surplus and deficit areas. It still continues to be the main feature of foodgrain trading. Both in regulated and other markets during the peak harvesting period, farmers still continue to be a victim of a series of malpractices, while marketing their foodgrain. Instead of providing marketing services like grading and warehousing facilities, the foodgrain trade mostly relies on speculative profits created by scarcity conditions during lean months.

2. Without building adequate buffer stocks by direct purchases from the farmers, the Foodgrain Corporation of India or any other State agency will not be able to provide adequate foodgrains for meeting the demand of rationed and non-rationed consuming areas. There being no wholesale buyers for traditional consuming urban towns, the farmers will again be forced to sell their produce below the scheduled rates during next harvesting season.

3. During my tour of newly developed canal like Tunga Bhadra, Nagarjun Sagar and Gandhinagar, I have found that these areas are very sparesely populated. Experience of old

should be adopted as a model for setting up similar special purpose land settlements in these areas.

4. These land settlements should primarily be colonised by Ex soldiers and educated youngmen who have attained specialised knowledge in respective fields. Special efforts should be made to rope in Ex-servicemen and soldiers, educated middle class intelligentia and skilled farmers, well-versed in light irrigated farming from highly congested farming areas for settling in these colonies. Good areas of most of the waste land and reverain reclaimed tracts which are about 10 million acres should be profitably used for this purpose.

5. These colonies would provide opportunities for the development of expertise land management and production techniques. In due course of time, these would build a bank of superior animal and plant germ plasma, which would improve the production capacity of small farmers.

6. A chain of these land settlements, interspersed by marketing and processing complexes, would provide a stable-base for attaining increased levels of production.

7. I give below a picture of such model colonies:-

(a) <u>Seed Production for General Farm Crops</u>:-

A seed multplication programme, as required by the cropping pattern of a particular area, should be obligatory for the allottees. Pedigree seed supplies would be made available by a technical agency such as National Seeds Corporation and I.C.A.R. etc. Seeds of varieties like Mexican wheat and Taichung-I, which are responsive to high dose of fertilisers, would be multiplied on these farms.

<u>Land Reclamation & Settlement Authority</u>

(i) Purchase of land:

A Land Settlement & Reclamation Corporation should purchase suitable ~~area~~ of land in co-operation with Agricultural Universities to operate specifically for seed production. It should be in blocks of 1,000 to 3,000 acreas. After developing, it would lease it out to progressive farmers, ex-servicement and trained agricultural scientists, specifically for growing quality and double crops seed produced in foundation seed farm. This land should be given initially on lease on specific terms such as:-

(i) good husbandry management,

(ii) production of desirable plant seed germ plasma, as required by the National Seed Corporation and the University of Agricultural Sciences and

(iii) act as demonstration farms.

In lieu of these obligations of the lessees, the State Government should charge a reasonable lease amount, leaving the option with the lessee to purchase the land in easy instalments. This entire project should be deemed by State on 'No Profit No Loss' basis.

(ii) Food Corporation of India will be invited in setting up a modern marketing centre, where producers will sell the seeds at scheduled prices and get from Food Corporation of India agricultural, inputs like fertilisers and insecticides, with FCI servicing as a mere financial agency. The contemplated co-operative agencies will provide the marketing, processing, distribution and warehousing facilities. These co-operative farming societies may be, more or less, on the model of Punjab Garden Colonies with such adjustments as warranted by local conditions.

a res adjoining the foundation seed farms should be s t up.

(iv) The crops involved are hybrid maize, hybrid bajra and Hybrid Jowar and any oth r Hybrids evolved or requested by the University of Agricultural Sciences and/or National Seed Corporation.

(v) The cropping pattern would be adjusted according to necessities.

(vi) National Seed Corporation should provide processing equipments of medium size, technical knowhow, and arrange for certification, standardisation at the production and distributi n level. The State Department of Agriculture will have the inspectorate for quality control, who wil. be trained by the N.S.C. for adoption of uniform standards.

(vii) The inputs other than the seeds, like fertilizers, insecticides, sprayers, including for seed will be made available by the co-operatives on behalf of a central agency representing F.C.I. scheduled Banks, N.S.C. and Agricultural Refinance Corporation.

(viii) The marketing of double cross seed would be financed jointly by NSC and FCI and distribution would be done by co-oper tiv s and approved dealers.

(ix) It should be the responsibility of the NSC to conserve the germ plasma of the foundation seed and single cross mat rial.

(x) The NSC will be responsible to introduce from time to time the desirable changes in the seed production programme.

(xi) It will be responsibility of the State Department of Agricultural Extension Service to arrange proper disposal o seed and to indent in advance i s requirements and activitvely involve itself in using its extension agency for propagation of seed sales programme.

(xii) In the event of surplus production of Hybrid Maize, the State Government will sponsor the setting up of a starch industry for mopping up the surplus. Similarly, the processing industry for dealing with surplus cereals for human and cattle consumption would be the responsibility of State Government.

(xiii) The fixation and implementation of fair prices at a economic level should be the responsibility of the State Government.

(xiv) A Committee consisting of representatives of the National Seed Corporation, Agricultural University, State Department of Agriculture, FCI, Scheduled Banks, Co-operative Institutions of any other agencies and representatives of growers of seed production and commercial seed growers and Farmers' Forum (India) should be set up to co-ordinate the activities and fix responsibilities of collaborating agencies.

(xv) Foreign collaboration in any of these measures to step up hybrid production particularly in the processing aspects, may be enlisted by NSC and/or the Agricultural University.

(b) Vegetable Crops:- To be raised for (1) table purposes, (2) for processing and (3) for seed production. Pedigree seed should be supplied by a technical body, such as NSC, etc. The seed production should be sold on pre-determined rates for distribution. The seed should be supplied for varieties and types that are amenable to the processing industry which should be set up in areas selected for vegetable crops colony. There should have facilities of quick freeze, dehydration, and cold storage. Transport facilities should be provided for table purpose vegetables'

(c) Frui Plantation:- Appropriate stock and scion combinations for a particular areas should be evolved. Specific fruit plants suiting the tract would be produced on approved nurseries. Storage, packing, transport and marketing facilities should be provided. Substandard fruit would be called and used for processing. It would be essential to set up fruit preservation industry in these garden colonies.

(d) Cattle Breeding:- In specialised area, mules for meeting the defence requirements, draught animals and dairy animals should be bred. Arrangements should be made for the supply of male and female pedigree stock to the colonisers, maintenance of pedigree bulls, provision of studs and keeper for housing them and facilities for artificial insemination would be taken care of by the land colonization authority. In collaboration with State Animal Hushandry Department. Being a long-term venture, the size of holdings should be comparatively larger.

These settlements should be made accessible by metalled road and served by electricity. Facilities for having all the year round green forage and legume, arrangement for forage seed production, supply of high tonnage forage seeds should be arranged. This overall approach for setting up special purpose farms would give rise to other highly specialised farms, which would be producing raw material for them. A combination of these farms would produce adequate quality and quantity of raw material or agriculture-based industries, which would be located at focal points in the producing areas.

(e) Sheep and Goat Bearing:- Sheep farming should be encouraged in tracts where long stretches of uncultivable areas are available.

(f) Fuel Plantation:- It should be encouraged in poor and sloppy lands, which are unfit for crop production. Nurseries of requisite plantation should supply the plants.

Allottees of these special purpose tenancies should be ensured that their produce would always be sold at economic proces. During the period required for getting into full production, the allottees should be given long-term low interest loans. It is essential to start these rural counterparts of satellite towns near big cities, which are draining national wealth and intelligence.

8. The Food Corporation of India should be entrusted with the work of setting up modern foodgrain and seed markets. This would guarantee scheduled prices reflecting adequate quality premium to the farmers.

9. The NSC would provide certification service and help in production and quality seed in collaboration with State Deptt. of Agriculture and progressive farmers, including the all allottees of these settlements. Agricultureal Reinance Corporation should arrange low interest loans for developing these colonies.

10. The Refuge Punjab Co-operative Garden Colonies are shining examples of achievements of planned land settlement. These colonies favourably compare with the best farming areas anywhere in the world.

11. Industries engaged in the manufacture of ready-to-serve and fortified foods should be encouraged by liberal allocation of controlled items such as electricity, finance, etc., as required by them. Similarly, existing installed capacity of food, fruits and vegetables preservation factories should

12. We should have a 'National Flour' with 85% extraction, as was the case in U.K. during the II World War. Supply of fortified and wholesome flour would be possible in the event of FCI being entrusted with marketing and milling of foodgrains in surplus areas. 5-10% of groundnut cake flour under scientific supervision should be mixed with wheat flour. This fortified flour, rich in protein, should supply a balanced diet to low income group children and expectant mothers. In the South, non-cereal foods like Tapioca may be mixed in suitable ratio of about 5%. The Food Corporation of India is contemplating to start such projects in collaboration with the Central Food Institute, Mysore. Besides providing balanced diet, these fortified foods would reduce pressure on cereals and make available equally palatable and better nutritious foods.

13. I have been trying to sell these ideas to policy makers. I am confident that under your dynamic leadership, the New Year would usher the advent of a balanced land settlement-cum-marketing and processing policy, insulated from political pressures. Professional farming experience should be harnessed for evolving a national food policy, which would put farm problems like size of holdings, pre-marketing and subsidization of inputs in correct focus. It would discipline agriculture by bargaining facilities and economic incentives with technical efficiency, sound management and trade by linking it with Food Corporation of India, both in surplus and deficit areas through regulatory markets and licensed storage. Functioning of foodgrain trade as agents of Food Corporation of India would ensure a pooled price of producing and consuming markets to the growers and consumers and would put an end to existing malpractices and cornering of stocks.

14. For ensuring fixation of remunerative prices to the farmers by the Agricultural Prices Commission, it is essential that an impartial fact-finding body like Bureau of Agricultural Economics, equipped with a well-knit field Organisation, should be set up. It should have an independent status like that of Comptroller and Auditor General, Government of India, for insulating it from political pressure. It would work on an agency basis and evaluate the cost of production. At the commencement of each Five Year Plan, the Bureau of Agricultural Economics should conduct a survey into the cost of production for the first 'base' year and, in each subsequent year, review the cost element to determine any variations from the base year and thus, establish a cost of production for each season, regionwise. It would evaluate the cost of production of different sizes, climatic and soil enterprises in the country. As an ad-hoc measure, the reports of existing agencies like State Board of Economic Enquiry, Universities and Land Settlements Operations, which evaluate the net assets in terms of producing costs, should be consolidated. While doing so, farmers' representatives and agricultural economists may be associated. It would indirectly highlight the impact of various administrative and taxation policies on the economic efficiency of agricultural production. It should also scrutinise the cost of manufacturing and/or imports including wholesale & retail margins of inputs like farm machinery, insecticides, etc.

15. These studies would be conducive in the formulation of a farm efficiency manual and indicate case studies of successful farming enterprises of various size groups.

intensive areas, should be equipped with such a farm efficiency manual and use the yardsticks of case studies of successful farmers while framing the budget and production plans of marginal farmers. This far-sighted policy would mobilise the extension service into an economic intelligence agency widely trained in both the technical and business side of farming. Ultimately, it would be conducive to reduce unit costs and make food production more competitive.

16. The necessity of emphasising the economic approach to individual farm problems is highlighted by inflated cost of inputs factors. There is a growing realisation that "Technical Efficiency" in the sense of technologically advanced methods of production conflicts with economic efficiency in the sense of net gains to the small farmer due to marketing exploitation.

17. This concept of adjusting food and fibre prices in relationship with cost of goods and services entering production would enable the small farmer to plough in his business full value of his labour and that of his family over and above what is spent in meagre living.

18. It is high time that the existing extension service is reoriented to perform the functions of an Agricultural Economic Service. Its findings would help the Government in regionwise price fixation of important agricultural commodities and introduce efficiency in farm management.

19. A farm Management Institute may be set up at National and State levels to tabulate the data collected by economic intelligence wing of extension services in the field. Assessment and application of a combination of technical and economic facts would enable the administration to create favourable climate for hard working farmers to up-grade their

production.

20. This economic tool should be used to det: price spread between the producer and the consumer. The surplus profits of traders, manufacturers, wholesalers and importers should be reduced to the level of economic service rendered by them and excess passed to the producer and consumer on some equitable basis by a Monopoly Procurement Scheme, through the agency of Food Corporation of India. The existing foodgrain trade would act as its agent. A part of the profits to Food Corporation of India should be passed on to the farmers in the form of a bonus, which would reflect the balance of a particular year in pooled price.

21. For making agriculture competitive and introducing efficiency in the rural sector, a Land Colonization Corporation as suggested, should be set up. Like the Land Mortgage Banks, it should be able to sell its debentures inthe money market and linked with Agricultural Refinance Corporation for procuring adequate finances. It should have subsidiaries at the State level. Areas which are brought under canal irrigation and riverne reclaimed lands to the extent of 10 million acres should be colonised on a planned basis. It should have the authority to get colonists from highly congested areas. Instead of sending foodgrains to a highly deficit State like Kerala, it would be advantageous to bring the surplus population to the newly developed colonies in a regulated manner, as is being

radius of 10 miles and specialised surplus population. This would integrate the whole country into a well-knit nation. Sparsely-popilated arid regions coming under canal-irrigation in Rajasthan, Madhya Pradesh and Tunga Bhadra in Mysore State need regulated immigrant settlement, processing a very high degree of farming skill, from highly congested pockets like Jullundur (Punjab). It is essential to remove the existing restrictions for the ownership of land by outsiders, particularly ex-soldiers in these States.

22. Now the climate is favourable for the adoption of a balanced land colonisation and marketing policy During the last year, I have expressed my views on various aspects of food production on many occasions. The central point is that professional farming talents may be introduced in the newly developed areas. All the servicing agencies at the State and National level, which have been set up for helping the farmers to step agricultural production, should be manned by knowledgeable farmers. The major shift in farm policy on these lines would put the Agriculture Ministry and Planning Commission on the saddle, instead of being accused in the dock for a series of omissions and commissions as a result of theoretical uncoordinate logistical planning.

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For Participants Only

AA II/10

SEMINAR
ON

AGRICULTURAL ADMINISTRATION

(March 9th-12th, 1966)

PLANNING AND PRODUCTIVITY IN AGRICULTURE

By

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PLANNING AND PRODUCTIVITY IN AGRICULTURE*

by

Tarlok Singh

I

THE CHALLENGE OF AGRICULTURE

Agriculture and economic growth

There is no precise historical parallel to the conditions and assumptions under which India is seeking to rebuild her economic and social structure. For particular facets of this effort analogies can be found. In specific directions, the experience of other countries and other periods bears on our problems and can be drawn upon. But the combination of circumstances under which India's planned development is being undertaken can be considered unique. Therefore, while drawing upon the experience, for instance, of the early stages of the Industrial Revolution in Great Britain, of the building up of a system of national economy in Germany, of the development of agriculture and small industry in Japan, of rural extension in U.S.A., of planning and State enterprise in USSR or of cooperative development in the Scandinavian countries and elsewhere, it is even more essential to analyse our own experience in depth. The materials available for such study are already plentiful; they need to be supplemented by field investigations, by systematic exchange of experience and a wider range of enquiry encompassing economic, social, scientific and technological problems as well as institutional possibilities. In particular

*This paper is based on three Extension Lectures at Osmania University, Hyderabad, delivered on January 27, 28 and 29, 1965. The paper follows the treatment in the lectures, of which the first was devoted to the 'Challenge of Agriculture', the second to 'Agriculture as an Industry' and the third to 'Agrarian Reform and the Rural Economy'.

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the problems of agriculture and the rural economy call for the combined application of several disciplines of knowledge and fields of experience accompanied by a vivid appreciation of the nature of rural life and the functioning of rural communities.

Planned development commences from a situation of lack of balance and proportion within the economy as a whole and in agriculture in relation to the rest of the economy. To establish a satisfactory balance and the conditions of self-sustaining growth is the purpose of planning, of industrialisation and of social reconstruction. These are in the nature of processes of development to be carried forward from one stage to the next and realised over a period. In range and scope the developmental effort changes and grows as it proceeds and as new problems arise. Nevertheless, in its limited sense, there has to be, within each given period, a certain quantitative balance between the demand for and supply of agricultural commodities, both in the aggregate and in relation to the non-agricultural sector of the economy. Therefore, given certain assumptions as to growth of population, growth of national, sectoral and per capita incomes, requirements of raw materials for industry, estimates of exports, nutritional and other standards to be met and the elasticities of demand for different products, it is possible to determine broadly the quantities in which different commodities should become available at each stage during the period of planning. The estimates will invariably be crude and will need revision from time to time. To a considerable extent gaps in availability can be anticipated and provided for. In the measure in which this does not happen, they will express themselves before long through changes in price levels, in the terms of trade between

agriculture and industry and in the balance of payments.

The problem of the marketable surplus is a special case of this general relationship between agriculture and the national economy. To begin with, the specific issue may be how the towns and the industrial centres are to be fed. The conditions under which the producer takes his surplus to the market change. Depending on the institutional arrangements which may exist, in the short period, the marketable surplus may diminish sharply if the grower and the trader have the ability to hold back or are permitted to do so. However, as more and more transactions within the rural economy take the form of sales for cash, the problem of the marketable surplus moves from the towns into the countryside. Hence, sooner rather than later, in a developing economy, marketing of agricultural produce has to be organised within a framework of State control, State trading and cooperative marketing. Both cooperatives and individual traders and growers have to function under the discipline of State trading and community responsibility. There is no escape from this conclusion.

In a growing economy, the role of agriculture is much wider than the problem of meeting the requirements of food and raw materials may suggest. As development proceeds, agriculture and industry come to be more and more closely linked. Increasingly, adequate availability of industrial inputs, such as chemical fertilizers, pesticides and implements and various forms of machinery and equipment becomes a necessary condition for rapid increase in agricultural production. Rise in incomes and the changing needs of the rural population provide the greater part of the demand for the products of industry, specially

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of consumer and intermediate goods. Industries remain but a relatively small sector of the economy until they spread to the smaller towns and the rural areas and the process of diffusion of the industrial and technical outlook reaches into the daily life and activities of the rural community. In turn, agriculture releases new manpower and enterprise for industrialisation, for the growth of towns and cities and for developing a wide range of processing and othe activities allied to agriculture. In time, with a stronger economic base and greater diversification, the rural areas should also contribut increasingly to capital formation and provide surpluses for investment in industry. However, in the first phase, it is inevitable that there should be a transfer of capital from the organised sectors of the economy into rural development. Indeed, there is a strong case for th argument that, to the extent possible, resources from the villages, gathered through cooperative institutions, small savings, life insurance and public loans should be channelled back to them as much as possible through projects for the economic and industrial development of rural areas. For, at this stage of planned development, their best use by far may be to strengthen and diversify the rural economy and raise the levels of productivity and income in rural areas. This will not come about without a positive national policy, supported by specific programmes and institutional resources. For, in the ordinary course of economic development, the main currents run strongly the other way, towards the widening of the already significant gaps between rural and urban levels of income and productivity, of well-being and opportunity. It is, therefore, a matter of the greatest urgency that the growth of agriculture

and of the rural economy as a whole should be planned for as an organic and fundamental part of the development of the national economy. Without this sense of direction, large numbers in the villages, specially the landless, will remain substantially outside the pale of development, poverty in the villages will persist, agriculture will continue to be much less than an industry, and the pace of industrial development itself will be slower than it need be.

Phases of agricultural development

Agricultural development may be conceived of as comprising broadly two sets of processes, namely,

(a) those designed to improve the technical and economic base of agriculture and to develop it as a stable and viable industry, and

(b) those designed to strengthen and change the economic and social structure of rural areas, to integrate all sections of the population into a system of productive relationships based on rising skills and equal opportunity, to diversify rural economic life and relieve the pressure on land, and to create the milieu for a richer community life and culture in the villages.

Each of these two main streams of effort comprises several different elements and activities. These latter are assigned inevitably to a number of different agencies. The institutions and services which have come into existence through community development and the growth of the cooperative movement, including those intended to provide for specialised and technical needs, are common to both aspects of agricultural development. For the greater part it is through community development, along with rural extension services, dissemination of the results of research and growth of cooperatives, that agriculture has to be transformed into an industry

increasing number of farmers. Efficient marketing and stable and remunerative prices become vital elements both in securing the marketable surplus from the rural areas and in stimulating a general increase in agricultural productivity. The second phase is a period of growth in which the scarcities in material inputs and credit and gaps in skill and organisation stand out prominently. Gradually, these deficiencies lessen, the increasing requirements are met and a growing proportion of farmers adopt the practices of scientific agriculture. However, problems of farm organisation and of diversification of the rural economy may only begin to be resolved during this phase.

It is in the third phase that, under the conditions of development in India, these problems should be expected to come right into the centre of agricultural and rural policy. For the economy as a whole, to gain the necessary dynamism and sustain a high rate of growth, a strong agricultural base, reduction in the numbers engaged directly on agriculture, adoption of modern technology and higher forms of organisation in agriculture and other rural activities, are as essential as the development of heavy and basic industries, a varied and fast expanding industrial structure and welfare services for the mass of the people. Only when both sets of conditions are realised within the scheme of economic growth, will it be possible to achieve an adequate degree of integration between the rural and the industrial and urban economy.

The present situation in agriculture would appear to correspond more or less to the second phase described above. In

working out a strategy for agriculture, therefore, special attention has to be paid to overcoming, as early as may be possible, the shortages and deficiencies which distinguish this phase, but are also, from another aspect, a measure of the greater demands which progress itself creates.

Progress in agriculture

The small advance in agricultural production during the first three years of the Third Five Year Plan is clear warning that progress in agriculture cannot be taken for granted. The marked increase in agricultural production in the fourth year of the Plan suggests that favourable seasons combined with sustained effort can change the situation for the better over short periods, but do not diminish the force of the warning. In looking at agriculture in terms of different phases of development, one can see in clearer perspective the progress in agriculture which has in fact been realised since the commencement of planned development. For this purpose, the study of 'Growth Rates in Agriculture', recently completed by the Economics and Statistics Directorate of the Ministry of Food and Agriculture, is a valuable source of information* The study contains index numbers of area, production and productivity for the period 1949-50 to 1961-62 for the country as a whole as well as for individual States. It also provides some comparable data for other countries. The study has to be followed by closer investigation on a regional basis of areas within India in which there has been marked progress and those in which serious lags have occurred. There should be systematic analysis of the economic, technical and social factors at work which could be identified in each area at different

*The writer wishes to acknowledge his debt to this study, from which the first five tables in this paper have beentaken.

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stages of the developmental effort.

The study by the Ministry of Food & Agriculture sets out data for growth of agricultural production on two different basis, namely, the three years from 1949-50 to 1951-52 and the period of three years from 1952-53 to 1954-55. The linear rates of growth for the periods 1949-50 to 1961-62 and 1952-53 to 1961-62 are set out in the table below:

All India linear growth rates of agricultural production

	Base period	foodgrains	non-food-grains	all crops
For 1949-50 to 1961-62	Average 1949-50 to 1951-52			
Agricultural production (%)		4.06	4.08	4.07
Area under crops (%)		1.82	2.79	1.99
Agricultural productivity (%)		1.90	1.06	1.75
For 1952-53 to 1961-62	Average 1952-53 to 1954-55			
Agricultural production (%)		2.66	4.40	3.23
Area under crops (%)		1.10	2.38	1.31
Agricultural productivity (%)		1.45	1.74	1.76

Taking the period 1952-53 to 1961-62, with the three years 1952-53 to 1954-55 as the base, the linear rates of growth of agricultural production and food production in a number of countries have been as shown in the table below:

Linear growth rates of agricultural production and food production in different countries during 1952-53 to 1961-62*

	Countries	Agricultural production(%)	Food production (%)
Far East	India	3.23	2.65
	Burma	2.01	2.33
	Malaya	3.82	5.49
	Indonesia	1.37	1.60
	Japan	4.62	4.84
	Pakistan	1.59	1.63
	Philippines	3.90	3.53
	Thailand	3.92	3.35
Near East	Turkey	4.71	4.73
	U.A.R	3.38	3.21

	Countries	Agricultural production(%)	Food production (%)
North America	Canada	0.74	1.33
	United States of America	1.66	2.16
Europe	France	2.64	2.68
	Germany, Fed. Republic	2.23	2.22
	Itlay	2.33	2.56
	U.K.	2.19	2.15
Ocenia	Australia	3.94	3.32
	New Zealand	3.80	3.07

*Except for India, the index numbers of agricultural production used above are those published by the FAO. in 'Production Year Book - 1962 pages 29, 30. For India, the index numbers as published by the Ministry of Food and Agriculture have been used. FAO's index for India gives a growth rate of 3.05 per cent for agricultural production and 3.12 per cent for food production.

Before proceeding to examine rates of growth in relation to different crops and increases in area, production and productivity, two broad inferences may be stated. The first is that both for foodgrains and for other crops, there has been increase in area as well as in productivity. The increase in area has been significantly greater for commercial crops. Productivity has also improved in respect of these crops, but not much more than for food crops. The index number for area under crops rose steadily from about 100 in 1950-51 to 116 in 1956-57. The subsequent increases have been smaller, the index number having risen to about 131 by 1961-62. Increases in agricultural production realised in recent years can be attributed to a greater degree to increase in productivity than to increase of area under cultivation.

The second broad conclusion which may be suggested is that, while comparisons of agricultural growth between countries present obvious difficulties because of the varying levels from which they

start and the diverse conditions under which their economies are expanding, over the period 1952-53 to 1961-62, agricultural and food production increased in India at a rate which would appear to be better than that achieved in nine countries, but lower than that realised in seven. Of the latter, three are countries sufficiently advanced in industry to be able to provide the materials and equipment needed for agriculture. In the others, expansion of area under cultivation and a variety of other factors may have operated, including mechanisation of agriculture and expansion of area, as in Turkey, institutional changes as in the UAR, and developmental programmes along with price incentives, as in the Phillippines, Thailand and Malaya. Obviously, there is need for closer investigation into the factors which have proved most influential. It should be added that, allowing for the high levels of productivity already achieved, among the nine countries whose rate of agricultural progress between 1952-53 and 1961-62 falls below India's, there are six with highly developed industrial economies and high levels of agricultural productivity and three whose economic situation corresponds more closely to that of India. With all the limitations in performance and organisation, of which we should always be conscious, India's record in agriculture can certainly bear scrutiny.

Over the decade 1952-53 to 1961-62, progress in agricultural production has been uneven as between different

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crops.

All-India linear rates of growth for different crops - 1952-53 to 1961-62

(Average 1952-53 to 1954-55 = 100)

Crop/Group	Production (per cent)	Area (per cent)	Productivity (per cent)
Rice	3.29	1.49	1.63
Jowar	1.55	0.16	1.40
Bajra	(-)0.27	(-)0.60	0.42
Maize	2.74	2.88	(-)0.07
Wheat	4.24	3.07	0.94
Total Cereals	2.79	0.91	1.77
Gram	3.04	2.47	0.50
Total Pulses	1.75	1.95	(-)0.17
Total Foodgrains	2.66	1.10	1.45
Groundnut	4.91	5.05	(-)0.25
Rapeseed & Mustard	4.67	3.56	0.97
Total Oilseeds	3.29	2.78	0.46
Cotton	1.87	0.72	1.02
Jute	4.82	3.74	0.88
Total Fibres	3.17	1.09	1.79
Tea	2.41	0.78	1.57
Coffee	15.15	3.71	9.04
Sugarcane	8.56	6.16	1.66
Total non-Foodgrains	4.40	2.38	1.74
All Groups	3.23	1.31	1.76

The table shows that in respect of millets, pulses and cotton, progress has not been satisfactory; on the other hand, for rice, wheat, oilseeds, jute, sugarcane and, among plantation crops, for coffee, the results are in varying degree encouraging, even promising of better performance in the future. These observations are borne out by a study of the area to area trends for each crop during the decade. Obviously, all the conditions and factors which govern levels of output for each crop under conditions prevailing in different parts of the country need to be examined as thoroughly

as possible, so that the right conclusions may be drawn for future planning. This has not yet been done.

Similar systematic examination needs to be extended to the evidence of differing growth rates for agriculture in different States during the period 1952-53 to 1961-62. The relevant data are summarised in the following table which includes fourteen States and one Union Territory.

Linear growth rates of agricultural production during 1952-53 to 1961-62

(Average 1952-53 to 1954-55 = 100)

State	Agricultural production(%)	Area under Crops (%)	Agricultural productivity(%)
1. Punjab	5.62	2.56	2.55
2. Madras	4.93	0.74	3.98
3. Himachal Pradesh	3.83	0.84	2.82
4. Madhya Pradesh	3.64	1.37	2.05
5. Mysore	3.56	1.25	2.12
6. Maharashtra	3.53	0.49	2.83
7. Bihar	3.40	1.08	2.16
8. Rajasthan	2.92	3.90	(-)0.76
9. Kerala	2.44	1.15	1.18
10. Gujarat*	2.22	0.68	1.50
11. Uttar Pradesh	2.04	0.85	1.13
12. Andhra Pradesh	1.91	(-)0.07	1.99
13. Assam	1.34	1.55	(-)0.20
14. Orissa	1.18	0.52	0.66
15. West Bengal*	0.89	0.18	0.51
All India	3.23	1.31	1.76

The States are arranged in two groups, six ranking above the all-India average and eight below the all-India average. Within each State, again, in different districts and regions fairly wide differences in rates of progress can be observed. In part, this may be traced to identifiable factors, but more complete understanding of the

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* For Gujarat and West Bengal, the first two years of the period 1952-53 to 1961-62 are considered somewhat abnormal. Leaving out these two years, for the period 1954-55 to 1961-62, the figures in columns (2), (3) and (4) would be respectively for Gujarat 2.57, 0.27 and 2.3%, and for West Bengal 3.13, 0.71 and 2.04%.

various elements at work is an urgent necessity. Indeed, a rewarding approach to a better comprehension of recent experience in agriculture and agricultural planning would be to establish the necessary facts by comparing yields in each area in terms of resource endowments such as irrigation, soil, combination of agricultural practices employed, cultivators with different levels of skill and, in each case, to attempt a careful causal analysis and seek the elements which, in any given period, have been specially significant. Such analysis would help adapt future development programmes for agriculture to the conditions and requirements of each area.

In comparing experience in India and other countries two important facts stand out, namely, the large differences in yields and the rate of change in yields. For crops like wheat, rice and cotton, between the base period 1948-49 to 1952-53 and 1962-63 there has been in India a sizeable increase in total output. However, for wheat the increase in yields has been small compared to USA or France, in rice compared to Japan and U.A.R. and in cotton compared to the U.S.A. Recognising that differences in levels of productivity exist within India as well as between countries, it would be useful for small teams composed of farmers, agricultural specialists and agricultural economists to visit selected countries so as to identify techniques and practices which could be of value in the development of Indian agriculture and could be integrated into the existing scheme of agricultural research and extension. Such an approach has been adopted in recent years as part of the movement for greater productivity in industry and could now be applied to agriculture as well with appropriate modifications.

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Tasks for the next decade

The development of agriculture, no less than that of industry, or of the economy as a whole, calls for a long-term plan of development. Among its main elements would be to improve the quality of land as a natural resource through irrigation, soil conservation and afforestation, provision of material inputs, larger capital investment, measures to raise the productivity of agricultural workers and better organisation for transmitting new knowledge to the entire body of farmers, policies designed to raise the efficiency of individual farm units and introduction of new technology in terms of the tools and machinery employed by the bulk of farmers. Such action requires long periods of effort and organisation. Similarly, institutional and social changes and administrative and organisational measures take time. At each stage, the steps to be taken have to be commensurate in scope and effectiveness with the objectives to be achieved. While a still longer perspective has a great deal of value, perhaps a decade is about the period for which, at each stage, there should always be a fairly detailed and integrated plan for the development of agriculture.

Until recently, such a view of future requirements was not available. However, there are now a number of investigations from which useful guidance can be obtained. Special reference should be made in this connection to the study by the National Council of Applied Economic Research of projections of demand for and supply of selected agricultural commodities, to Dr. P.V. Sukhatme's study of India's food requirements upto 1981, and of studies undertaken by the Institute of Agricultural Research Statistics

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and the Perspective Planning Division of the Planning Commission. In connection with the preparation of the Fourth Five Year Plan, a Working Group in the Ministry of Food and Agriculture has also developed in some detail tentative demand projections for the Fourth and Fifth Plan periods for foodgrains, cotton, oilseeds, sugarcane and jute. Inevitably, many assumptions have to be made in preparing such projections - assumptions as to population growth, growth of national income (in itself dependent in no small measure on the growth of agriculture), consumer expenditure, elasticities of demand for different products, norms for consumption of foodgrains and other food articles to be attained over a period and estimates of requirements of raw materials in relation to different levels of industrial output, export demands, etc. Such projections have to be worked out afresh from time to time, but they provide a frame of reference by which the efficiency of measures for the development of agriculture and industries serving agriculture can be tested. Even more important than the actual estimates and projections are the broader perspectives and guidelines which thus become available.

By way of illustration, the following table based on the report of the Fourth Plan Working Group on Demand Projections sets the requirements of important agricultural commodities side by side with the levels of output at the end of the First and the Second Five Year Plans and those presently estimated for the Third Plan. For the Fourth Plan the table also shows the tentative estimates of production indicated in a recent memorandum of the

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Planning Commission.

Production and demand for agricultural commodities - 1955-56 to 1975-76.

	Unit	1955-56 production	1960-61 production.	1965-66 Estimated production in Third Plan Report.	1965-66 Estimated production in Fourth Plan Memorandum.	1970-71 Estimate of aggregate demand.	1970-71 Estimate of production in Fourth Plan Memorandum	1975-76
Food grains	million tonnes	66.0	81.0	100.0	92.0	122.0	120.0	152.[illegible]
Cotton	lakh bales	40.0	53.9	70.0	63.4	85.0	88.3	108.[illegible]
Oilseeds	million tonnes	5.7	6.6	10.0	7.5	12.5	10.0	15.[illegible]
Sugarcane(Gur)	-do-	6.1	10.6	10.2	11.0	13.5	13.5	16.[illegible]
Jute	lakh bales	42.0	39.8	62.0	62.0	80.4	80.0)	115.[illegible]
Mesta	-do-	11.5	11.3	13.0	18.0	20.0	20.0)	

It will be seen that over the fifteen years, 1960-61 to 1975-76, allowing for diversification of output and the growth of dairying, animal husbandry, fisheries and poultry, nothing less than the doubling of the total agricultural production is called for. This implies a cumulative growth rate of about 5 per cent per annum over the entire period. In view of the setbacks which have occurred over the past three years, even if the estimates for the Fourth Plan given in the Memorandum are realised, a cumulative growth rate of 5½ to 6 per cent has to be attained over the decade comprising the Fourth and Fifth Plan periods. It is against these dimensions that the present objectives and production estimates for the Fourth Plan have to be seen.

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In quantitative terms, the tasks in agriculture over the next decade are formidable enough. In human and social terms, they are still larger. Therefore, alongside measures for developing agriculture as an industry, it becomes necessary to devise ways of strengthening the agrarian structure, employing the available manpower resources intensively and gainfully, bringing into agriculture, through co-operative farming and other means, all possible gains from scale, investment and organisation, speeding technological changes in agriculture and taking industry into small towns and rural areas. For carrying out these tasks, all the resources of leadership and organisation within the community and on the part of the Government and the administration as well as cooperatives and Panchayati Raj institutions have to be effectively equipped and harnessed.

AGRICULTURE AS AN INDUSTRY

One of the main objectives in the Five Year Plans is to transform agriculture from being, what it was traditionally - a way of life for millions of people - into an industry with rising levels of productivity, incorporating the practices of scientific agriculture and making use of improved technology in all the operations of farming. The implications of this change go far beyond the specific programmes of development associated with agriculture. They bear upon the agrarian structure as a whole, the place of the masses of landless labour in the rural economy, the system of farm organisation and the manner in which the rural and the industrial economy should be integrated with each other. In the narrower sense, viewing agriculture as a field of technical development designed to achieve the maximum crop production under existing conditions of tenure, plans for developing agriculture as an industry will comprise broadly four types of measures, namely,

(a) measures for improving land as a natural resource;

(b) adoption of scientific agriculture, including application of improved agricultural practices, provision of the necessary material inputs, increasing the productivity of labour by imparting greater skill and making more intensive use of manpower, and ensuring greater capital investment per acre of land;

(c) increasing the efficiency of existing farm units through consolidation of agricultural holdings, crop planning and cooperation between cultivators in various farm operations and in organising common services; and

(d) speeding technological change in agriculture through the use of improved agricultural implements, introduction of machinery and equipment for saving time and labour, and promoting mechanisation of agriculture wherever feasible.

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Land as natural resource

As a resource limited by nature in quantity, upto a point, the area of land under cultivation can be extended. Allowing for increases in area for which agricultural statistics were reported, the area under crops increased during the First Plan by about 13 per cent and during the Second Plan by about 5 per cent. Substantial increases in cultivated area occurred in Rajasthan, Punjab, Assam, Maharashtra, Madhya Pradesh, Mysore and Kerala. Surveys of blocks exceeding 250 acres in area carried out towards the end of the Second Plan by the Committee on Location and Utilisation of Wastelands establish the comparatively small scope which exists for reclamation of land available in large blocks. The total area proposed for reclamation in nine States which were surveyed amounted to about 1.2 million acres. On closer study of soils and of costs of development the area for reclamation and development on economic lines would turn out to be even smaller. It would, therefore, be correct to say that the main approach to land as a natural resource must be in the direction of raising the quality of the soil and increasing its potential for production through irrigation, soil conservation and dry farming and the use of fertilizers and manures. These measures are needed also in respect of areas which have been reclaimed over the past decade or so. In several of these, the yields are still low. The initial effort to bring new land under cultivation has not always been followed by adequate programmes for agricultural development and soil improvement.

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The Five Year Plans have placed considerable reliance on irrigation, both through major and medium-sized works and through small works. Irrigation represents one of the most important areas of investment under the Plans. Thus, it is reckoned that major irrigation schemes taken up during the first three Plans have a total potential of about 44 million acres (gross), which represents about 40 per cent of the estimated ultimate potential of 112 million acres (gross) from major and medium schemes. The corresponding potential from minor irrigation schemes is reckoned at 75 million acres (gross). The total area irrigated by works taken up during the first three Plans may eventually be of the order of 30 million acres. Estimates of progress in minor irrigation as reported by the authorities concerned have still to be reconciled with official agricultural statistics. The time lag between the two could be but only one of the explanations. The tentative view that the ultimate irrigation potential from major, medium and minor irrigation schemes may be of the order of 187 million acres (gross) against a total crop area of 376 million acres obviously also needs more detailed investigation and collection of further data. In this connection, a fact to be marked is that the area sown more than once in the year increased between 1949-50 and 1959-60 from 38 to 49 million acres or from about 13.5 per cent to 15 per cent of the total area sown. During the same period the gross irrigated area according to the available statistics increased from 50 to 59 million acres. In addition to irrigation, an important means of improving land as a natural resource consists of measures for soil conservation, dry farming and afforestation. In these, until recently, in the

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country as a whole (with exceptions like Maharashtra and Gujarat) progress has been slow. The possibilities of extending these programmes through the full utilisation of manpower resources and under proper technical guidance are indeed vast. In particular, soil conservation for agricultural lands and dry farming can be pursued on a large scale as a major item of community action and popular participation. As with reclamation of culturable wastes and extension of irrigation, coordination with other programmes of agricultural improvement and the need for adequate follow-up cannot be too greatly stressed.

A real weakness in the existing system of planning for agriculture lies in the fact that too little attention is being given to the determination of the best crop patterns for each area, both for irrigated and unirrigated lands. Crop planning for an area has to be distinguished from crop rotations for individual farm units. Crop planning implies careful consideration of past trends, of the factors accounting for them, of the directions in which, in the light of past experience, deliberate change could be stimulated towards more productive utilisation of land and improved crop patterns. A crop plan for an area is in the nature of a general design of development in relation to which a considerable part of the local agricultural effort can be organised including, specially, improvements in the distribution of irrigation, supply of improved seeds, adoption of better tools and chanelling of larger amounts of credit. Crop planning does not imply that there should be physical regulation of areas to be put under different crops. However, for a general scheme of crop planning to succeed, it is essential that the difficulties inherent in setting up

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crop patterns for an area as a whole, including those pertaining to irrigation, be recognised and provided for. Once the broad lines have been determined for any area, special steps should be taken to make it possible for cultivators, both as groups and as individuals, to adopt the recommended crop patterns.

Industrial and material inputs

The key role of inputs in agriculture is now realised much more acutely than in the past. These inputs are among the important links between agriculture and the rest of the economy. Around such inputs development in a number of different sectors has to be organised so as to subserve the interest of agriculture. Besides fertilizers, pesticides and agricultural machinery, agriculture demands a variety of other goods and services, such as equipment for drilling, processing, demonstration and testing, commodities like steel and cement and surveys, research and extension. The requirements of material inputs have to be assessed and planned for in the aggregate in relation to individual crops as well as individual areas. Estimates of requirements have to be cross-checked against likely supplies over a plan period and for each separate year. Subject to limitations of supplies, the extent to which agriculture may absorb the various inputs will depend, above all, on the knowledge and receptiveness of peasants, the quality of the extension network, efficiency of distribution and the strength of cooperative agencies. In making use of material inputs such as fertilizer and agricultural machinery the question of costs and returns is of paramount importance. The inputs have

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to be brought within the limited means available to the farmer, both through subsidisation and through reduction in the costs of producing and distributing them. In the next phase of development, subsidisation will have to be undertaken on a larger scale than has been contemplated so far, but the period may be shortened if the rate of growth in agriculture can be accelerated and close attention is given to the lowering of costs of production and distribution.

Scientific agriculture

Increased supplies of industrial and material inputs should be regarded as the spearhead for a campaign for scientific agriculture. However, the adoption of scientific agriculture implies increase in the productivity of labour, more intensive use of available manpower and greater capital investment per unit of land. A study undertaken by an expert committee of the Indian Council of Agricultural Research three years ago showed how much scope existed for adopting improved practices which had been already developed in different parts of the country. It is being increasingly realised that the gap in skills between good farmers and the general body of peasants can be reduced through effective harnessing of the more highly skilled and successful agriculturists. In each area the more skilled farmers have to be brought organically within the scheme of extension services and given opportunities of communicating their experience and extending their influence among cultivators. Differences between the more efficient and the less efficient farmers are reflected not only in their skills and practices but also in the extent of farm investment they undertake.

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The average investment per acre of land is still too low. For instance, in two progressive districts in the Punjab, Amritsar and Ferozepur, for which farm management studies are available, it was observed that the total farm investment per acre, excluding the value of land, amounted only to Rs. 235. This included dwelling houses, cattle sheds, wells, implements and machinery, etc. Investment on improved implements worked out only to Rs. 5 crores.

The problem of increasing the productivity of labour has two aspects. First, to the extent to which irrigation is provided, we create the conditions in which there can be more intensive use of labour. In the Punjab, for instance, on irrigated land the labour input per acre came to 23 days of 8 hours each as against only 12 days on unirrigated land. Rapid expansion of irrigation facilities is an essential condition for creating the conditions of intensive agriculture. Secondly, ways must be found of making much fuller use of the available manpower resources. In different parts of the country, periods of anything from three to five months and sometimes longer represent slack agricultural seasons during which one-fourth to one-half of the labour force is available for full-time work at village wage rates. In most areas a large labour force is ready to be put to much more productive use.

Efficiency of farm units

The third group of measures for developing agriculture as an industry are intended to raise the efficiency of existing farm units. Apart from crop planning and provision of services, so far the

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main approach here has been that of consolidation of holdings. Significant results have been obtained in consolidation operations undertaken in Punjab, U.P., Madhya Pradesh and Maharashtra, but progress in the southern parts of the country has been comparatively small. There can be no doubt that if we wish to alter the rural environment, create better living conditions and provide a basis for intensive peasant farming, consolidation of holdings should be given a key place in the scheme of rural development.

Technological change in agriculture

Perhaps the most important single lag in agriculture has been in the sphere of improved technology. The average farm unit in India is ill-adapted to rapid or large-scale technological change. Low efficiency of the great majority of farm units is both a cause and an effect of slow technological progress. Every consideration points to the need during the next few years to invest to the maximum in technological change and industry increasing labour productivity. We have to think of improved technology more comprehensively, covering such diverse aspects as making more power available for agriculture, better preparation of land for various operations and mobilising in the service of agriculture. To bring about rapid technological change, a wide range of problems have to be solved. Research has to be intensified so as to determine which implements will serve best under different conditions of soil and climate. There are problems of extension, demonstration and training. There are critical shortages of technical personnel to be reckoned with. Even if experts are able to establish the implements and the

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machinery which should be widely used in an area, there are serious problems of organisation, including the ensuring of supplies of raw materials, use and development of fabricating capacities, planning of production, organisation of servicing and securing a measure of standardisation and quality control. Technological change is necessarily costly. On the one hand, it is important to ensure that agricultural implements and machinery should be low-priced; on the other until production reaches an adequate scale and key components can be manufactured in bulk, it is difficult to achieve a sufficient degree of standardisation. Provision of credit for agricultural implements has played hitherto too small a part in the scheme of cooperative finance. So far as the more expensive implements and machinery are concerned, within the conditions set by accepted land policies, it is necessary to promote use on a cooperative basis as well as facilities for hiring from Panchayats and cooperatives. In respect of small implements, however, it is essential that, in the course of a few years, at any rate, in areas in which intensive agricultural work is undertaken, every farmer should be put into possession of the essential improved implements. There is a close relationship between improved implements and improved agricultural practices, and the two should be regarded as part of a single approach.

Intensive agricultural areas

We have now reviewed briefly the main facets of the problem of developing agriculture as an industry. Changes of this nature cannot be brought about throughout the country simultaneously, nor can they be achieved without considerable specialisation on the part of the agricultural services. This leads us to two more important

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aspects of agricultural organisation, namely, approach of intensive areas and the reorganisation of agricultural administration. When the community development and national extension programme was taken in hand more than twelve years ago, it seemed difficult to contemplate that for years to come the essential community services should be available for some parts of the country, but should be denied to others. Moreover, community development and extension services were looked upon as essential ingredients in the system of rural administration to be established in all areas. Accordingly, the scheme of community development was extended fairly rapidly to all parts of the country. We find now that even in areas which have had five or ten years of development, if there has been no fundamental change in the physical resource base, as through irrigation, electrification, urbanisation or industrialisation, the rural economy still continues to be in the relatively early stages of development. There is indeed greater awareness and some degree of change in the social environment Certain services have already become available and, within limits, the people of each area have the resources and the technical guidance, for achieving more rapid development. Yet, in most districts in the country, the proportion of the rural community which has been effectively influenced in the direction of new technology and new occupations and skills is still small. It must be admitted that the period of preparation for rapid and wholesale change in rural areas is much longer than was thought to be a decade ago. Side by side with this appraisal, there is the consideration that rapid increase in agricultural production has now assumed an urgency in the nation's life which calls for radical

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measures and for departing from some of the assumptions on which work on community development has so far proceeded. There is no gainsaying that in the next phase of development the conflict between concentration and dispersal of resources has to be decided in favour of selection of areas where conditions are more favourable for intensive cultivation and sharp increase in production. These areas may represent about one-fifth to one-fourth of the total cultivated area of the country. This view of development has been strengthened by the experience gained under the intensive agricultural district programme. Work in the intensive agricultural districts has already helped develop important techniques of development, specially in the extension of improved practices and in the organisation of agricultural services. The intensive cultivation areas which have been marked out in various States are a further step in the same direction.

Intensive agricultural development involves not only measures directly related to the development of agriculture, but also those concerning the buildingup of institutions like Panchayats and cooperatives, steps to carry assistance and resources to the most vulnerable groups of farmers, schemes for the more intensive use of manpower for creating community assets and improving irrigation and communications, and better organisation of marketing. At every step resources and skills available within each area have to be turned to the best advantage. Yet, intensification of agriculture marks only the first break in the development of the rural economy. In the rural areas, wherever one may begin, it is soon apparent that from agriculture one must go on to rural life as a whole, to the building up of a diversified rural economy with a great deal of industry growing up in small towns and in the larger villages.

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Without these the basic character of rural life will remain substantially unchanged.

Organisation of agricultural extension

To produce the necessary impact on agriculture, specially in the intensive agricultural areas, there have to be important changes in the organisation of agricultural services. This is a large theme, but two aspects deserve special mention. The first is the role of agricultural research and of agricultural scientists in the extension services. Without a large and growing research base and a continuing stream of research findings to be applied in the field, extension workers can hardly promote rapid technological change. Secondly, agriculture demands increasingly specialised and skilled services. When the community development programme was taken up in the early fifties, the principal consideration was that the various agencies of Government had sought to reach the farmer independently and none of them was in a position to do so. Therefore, the first step was to provide a multi-purpose village level worker to function on their behalf in a group of villages. It was realised that as development proceeded there would be need to provide skills of a higher order. The change should have perhaps come sooner. It has now become imperative that there should be a bifurcation of functions at the village level between those concerned directly with agriculture, including cooperation and animal husbandry, and those working with village Panchayats and helping them to take their full share in intensifying agriculture and accelerating development at the village level. The creation of two separate cadres of village functionaries is

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a necessary reform which has to be carried out first in areas marked out for intensive agricultural development and later in all other areas.

III

AGRARIAN REFORM AND THE RURAL ECONOMY

Size and distribution of holdings

In Indian economic literature the problem of size and distribution of agricultural holdings had for long a central place. Over the last decade, however, this subject has received inadequate attention from scholars and administrators alike. This may be because the task of establishing efficient farm units is so formidable, indeed so fundamental, as to appear to be virtually beyond solution within the existing institutional framework. Perhaps, it is felt that despite existing limitations, through irrigation, extension facilities and more effective price policies and marketing arrangements, a fair measure of advance can be achieved. Eventually industrial and economic development may help diminish the pressure on land and facilitate solutions of the land problem which may not be feasible at present. Thus, for one reason or another, our development plans have failed so far to deal with what is still and will remain the basic agrarian problem of the Indian economy.

The size of the problem is fairly established in the data obtained in the sixteenth round of the National Sample Survey. In the country as a whole, holdings below 5 acres numbered 63 per cent and accounted for 19 per cent of the cultivated area. Holdings upto 10 acres numbered 82 per cent and accounted for 39 per cent of the cultivated area. Holdings upto 20 acres numbered 98 per cent and accounted for 62 per cent of the cultivated area. Holdings upto 30 acres numbered 97 per cent and accounted for 75 per cent of the cultivated area.

More detailed data were collected with the census of land holding and cultivation which relates to the year 1953-54. Areas owned, leased and under personal cultivation were separately listed. In some States

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complete enumeration was undertaken, in a few holdings above 10 acres were reckoned, and in some sample surveys were carried out. The table below presents illustrative data for Andhra Pradesh, Madras, Gujarat and Maharashtra and Uttar Pradesh. For Uttar Pradesh data were obtained on a sample basis, for the others through complete enumeration:

Size and distribution of holdings in 1952-54

	Cultivated area owned upto (acres)					Cultivated area under personal cultivation upto (acres)				
(A) Holdings (%)	2.5	5.0	10.0	20.0	30.0	2.5	5.0	10.0	20.0	30.0
Andhra Pradesh -										
Andhra region	47.5	66.8	82.8	93.0	96.3	47.8	67.4	83.5	93.5	96.7
Telangana	24.2	40.6	61.2	80.6	88.4	25.1	41.6	62.1	81.1	88.9
Madras	29.6	46.7	66.4	83.7	91.0	29.7	46.9	66.5	83.8	91.1
Gujarat & Maharashtra	44.9	67.5	85.4	94.9	97.4	45.7	68.3	86.0	95.3	97.7
Uttar Pradesh	68.6	85.4	95.1	98.8	99.5	68.6	85.4	95.1	98.9	99.6
(B) Area (%)										
Andhra Pradesh-										
Andhra region	7.9	18.2	34.7	55.7	67.4	8.3	19.1	36.4	58.4	70.5
Telangana	1.8	5.7	15.3	32.9	45.3	2.0	6.4	16.8	35.6	48.9
Madras	3.0	8.3	20.4	41.3	56.4	3.1	8.7	21.1	42.7	58.5
Gujarat & Maharashtra	8.7	21.7	41.6	62.6	72.4	9.4	23.2	44.0	65.5	75.2
Uttar Pradesh	22.0	43.4	67.4	85.2	91.2	22.0	43.4	67.5	85.4	91.4

The table bears out the broad trends shown by the National Sample Survey. It also brings out the fact that conditions will vary considerably between States and correspondingly, between different regions in the same State. Within limits, agricultural programmes and policies should, therefore, be adjusted to meet the requirements of the agrarian structure which may be peculiar to each State or region. The data cited above are several years old. They probably under-state the extent of land cultivated by tenants, a tendency which appears to have been accentuated in recent years. It is essential, therefore, to provide within the system of land administration for accurate returns at regular

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intervals on the distribution, ownership and cultivation of agricultural holdings. Such returns are not at present available in the ordinary course.

Over the greater part of the country, at least 70 to 80 per cent of cultivators' holdings are less than 10 acres and atleast 50 to 70 per cent holdings are less than 5 acres. Considering the large numbers involved, to ensure the welfare and progress of the rural economy, as a whole, both policy and administration should be designed to raise the productivity of small cultivators. To those, as explained later, we must add the large numbers who are landless labourers and live on the fringes of the agricultural economy.

If data such as have been collected for different States and regions could be broken down in terms of irrgated area, or in relation to lands of high or low productivity or for different crops, the problem of small and uneconomic holdings and that of fragmentation would loom even larger. Sometimes, the example is cited of small holdings in Japan or of successful cultivation by skilled market-gardeners in the vicinity of towns or of intensive cultivators in certain favoured regions in the country to prove that small holdings may not or need not be necessarily unprofitable and, doubtless, much can be done to improve their economics. Farm management studies which are now available for a number of districts for a few years provide useful evidence on this point. The broad conclusions which may be drawn from those studies in relation to the present argument are:

(1) In terms of gross produce and gross return, frequently small holdings (say, five acres and less) do not compare unfavourably with the comparatively larger holdings; frequently, the labour inputs on small holdings may be proportionately greater.

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(2) The larger holdings are able to secure a distinctly higher proportion of inputs which come from outside the farmer's domestic economy, such as fertilizers, pesticides, credit, better tools and improved varieties of seed.

(3) In terms of net return and net capital formation the larger holdings turn out to be at marked advantage.

Undoubtedly, it is the foremost task of agricultural and cooperative extension services to reduce the disadvantages to which small farmers are subject, to bring to them all possible gains from improved scale and organisation of supplies, marketing and credit, and to ensure that the industrial and other inputs needed are made available. The question, however, remains whether small farmers will not remain continuously handicapped unless larger and more efficient farm units are created. A large proportion among them are too close to the poverty line. The system of credit and supplies is not yet designed to render adequate service to the small man and some of the impediments are inherent in the situation itself. The total resources available for investment in rural development leave at present only a small margin for rehabilitation finance. Where intensive cultivation under conditions of controlled irrigation becomes possible, as in the Punjab or in U.P., after agricultural holdings are consolidated the disadvantages of small farms are materially reduced, at any rate, for a period of several years. While fuller support from agricultural and cooperative services can make a considerable difference, the basic limitations persist, and beyond a point the scope for development under existing conditions may not in fact be as large as is often assumed.

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Land reform

For nearly fifteen years land reform has been an integral part of the country's plans of economic and social development and much store has been set by it. The first article in the strategy of land reform was the abolition of intermediary tenures, which accounted in the past for some 40 per cent of the total area, specially in the permanently settled tracts, in Rajasthan, in the former Hyderabad State and in parts of Madhya Pradesh, Madras and other States. The call for land to the tiller rose at first from concern with the rights of the occupancy tenant who was closest to the soil. Only after Independence it came to be extended to the tenant cultivator working on land leased by the peasant, whether he is a proprietor or an occupancy tenant. Even to this day, this wider concept has not been fully appreciated, muchless implemented.

For the tenant-at-will, land reform policies envisaged two sets of measures - those calculated to provide for security of tenure and fair and reasonable rents, and those intended to confer upon him rights of ownership over land under his cultivation. With some important exceptions, legislation in all States provides for protection from ejectment and a degree of security. However, as several investigations show, there has been in fact considerable evasion. Advantage has been taken of the economic and social weaknesses of tenants and their ignorance of the rights conferred by law to enter lands in fact cultivated through tenants as lands under the personal cultivation of owners. The interest of owners, specially the larger ones, have combined with administrative and political failure to deny justice to tenants. It is difficult to say on what scale there has been such failure in implementation and it is equally possible to minimise or to over-state it. However, enough is known to make it imperative for each State to provide for internal

checks within the system of administrative supervision and reporting, to ensure that abuse is detected and wrong prevented.

The mischief occurs both in the matter of the right to stay on the land and in respect of rents. In all States, rates of rent much below the customary ones, varying usually from one-third to one-sixth of the produce, have been prescribed by law. The rural community as a whole has not been roused to a sense of social and economic justic as between its constituent elements and the social objective has yet to be impressed upon those who are appointed to positions of responsibility in Panchayat institutions and cooperatives. The insistence upon those aspects from administration and leadership at the State level and the effort given to the education of the rural masses in these matters have been quite inadequate. These failures express themselves in the policies and outlook thus far of agriculture departments and cooperativ institutions. By and large, in their concern for output, agricultural personnel have tended to look to the larger cultivators rather than to the involvment of the entire agricultural community and the upgrading of their practices and technology. To many among them, agrarian reform has seemed an impediment to rather than as a means for raising producti and yields. Even where rights have accrued in fact to tenants and small cultivators, the support which agricultural extension services have provided has been meagre. To an extent, because of limitations of resources, this might have been inevitable and could be mended but slowly. At any event, with the larger effort now under way, specially in the intensive agricultural areas, in supplies, credit and technical assistance, it should be possible to give much more effective support both to small cultivators and to those who come into possession of land as a result of land reform legislation.

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In the scheme of land reform, beyond the protection of tenants, there are two further stages. One is to obtain lands above the ceiling by way of surplus and to make them available to the landless and to the smaller cultivators. The second is to enable those who settle on such lands to become full owners. These two sets of measures have been thought of as a necessary prelude to the building up of an agrarian economy in which economies of scale and investment and diversified development are to be realised through a steadily increasi measure of cooperation in production as well as in other activities. Together, they form a consistent scheme of development for the rural economy, keeping in view the need for increasing agricultural production, rehabilitating small cultivators and giving to the landless sections of the population the opportunity to work for a better life and to become equal citizens with others. Those larger objectives and their importance for making political freedom meaningful in terms of the lives of the millions are not yet understood widely enough. Perhaps, this may be the main explanation for delays in enacting legislation for ceilings on land holdings in certain States as well as for delays in implementing such legislation as has already reached the statute book. In any event, these delays have served long enough notice to large numbers of land-owners to enable them to do away with or to disguise possible surpluses of land. For the time being, the important objective of limitation of land holdings has been largely frustrated. This does not diminish the validity of the objective or its inevitable persistence as a goal in national planning but, doubtless, the task will now be accomplished over a somewhat longer period than was intended or justified. The ceiling on agricultural holdings was

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never seen, though it has been sometimes interpreted, as a ceiling on rural incomes. It is essentially a step in the reorganisation at the base of India's agrarian structure so that, with rights in land distributed more equitably, the rural economy could be modernised and all those who depend on it might share in the benefits of development.

Along with ceilings on land holdings, the Five Year Plans have also stressed the need for conferring rights of ownership on tenants settled on surplus lands as well as on other cultivators. On the whole, the legislative provisions for this have been inadequate and the extent to which effect has been given to them still more so. The minimum condition was to ensure a direct relationship between the Government and two groups of tenants, those already on land and those settled afresh on non-resumable lands. Such direct relationship can be ensured best by means of bonds issued once for all, supported by modest financial allocations under the Five Year Plans for assisting tenants and for making cash payments to certain categories of owners to whom part at least of the compensation has to be paid in cash. Such a provision has not been made in the Second or the Third Plan which proceeded on the assumption that land reform could be an entirely self-financing progress. Experience disproves this and it is important to take the lesson into the Fourth Plan.

Cooperative farming

As stated earlier, land reform - with its three essential conditions, namely, protection of tenants, ceilings on land holdings and rights of ownership for all cultivators - and growth of cooperation in production and other activities, together with general economic development and diffusion of industry, form an integral approach

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to the re-shaping of the rural economy. There has already been a measure of success in developing cooperation for credit, marketing, processing and distribution of consumer goods. The principle of cooperation has still wider application. In a number of directions some degree of advance has been made, as in construction, housing, transport, etc. Yet, so far only a fraction of the possibilities of cooperation in the xx context of India's development has been realised. There is indeed no richer field for constructive effort on the part of Panchayati Raj institutions, voluntary organisations, local leaders and social workers. Sufficient experience has to be gained to be able to identify the inherent problems of organisation, method and training and to diminish greatly the chances of failure in cooperation provided only that the necessary concentration of effort and resources is ensured and that the tasks and objectives to which the cooperative approach is applied are selected with care. However, there is one field in which this claim cannot yet be made, namely, cooperative farming.

Cooperative farming has to be seen, not in isolation, but as part of a scheme of development in which the resources and energies of large numbers of small farmers are harnessed, so that they can create, largely through their own effort, a more viable economy based on mixed farming and rural industry, application of science and technology and greater investment. Cooperative farming is often believed to be only a way of rehabilitating the economy of small and uneconomic farmers. While cooperative farming must bring the maximum relief to them and their needs are most urgent, it has also other and wider aims. Cooperative farming is, above all, a means

for the reconstruction in a fundamental sense of the pattern and organisation of rural life as a whole. Since the growth of cooperative farming is seen as a voluntary movement, which is supported by reasonable incentives, but is dependent essentially on successful demonstration and practice, even under favourable conditions, many years of sustained effort will be needed before a substantial part of the cultivated area of the country can come within its scope. The necessary conditions for success in cooperative farming as a popular movement have yet to be established. The recent study by the Committee of Direction on Cooperative Farming and the investigations of specific examples of cooperative farming experience in recent years, bring out the several directions in which effort has been wanting, both at the level of policy and in administration.

Of over 3000 cooperative farming societies in the country, about one-half are in what are known as pilot areas and the others have grown up as a result of local initiative. Commonly, the average area of a cooperative farming society is too small. In many instances, the forms of cooperation have been exploited to their advantage by a small number of families with a few others joined to themselves merely to fulfil the legal conditions for setting up a cooperative farming society. Motives such as evasion of land reform legislation, replacement of agricultural labour by mechanised cultivation and the desire to obtain assistance from State Governments account for a proportion of the existing cooperative farming societies. Frequently, the members bring part of their land under cooperative cultivation and work on the rest as individual farmers. Even though some useful lessons can be learnt, such important aspects as organisation and distribution of work, so as to strengthen

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incentives for higher output and more intensive working on the part of individuals, families and groups, methods of providing for the return to ownership and problems connected with diversification of activities, finance, introduction of new techniques and management, still require closer investigation. In this sense, the pilot projects undertaken during the Third Plan have not served their purpose as well as was hoped for. Here, it is necessary to stress the importance of controlled experiments in cooperative farming, that is, experiments which are undertaken in a genuine wayby local groups or communities, with the necessary preparation and participation, and under conditions of systematic observation and evaluation. Many weaknesses which have come to light are capable of being eliminated, and suitable forms of cooperation in agriculture and other activities can be so developed that they become a precise response to the needs, character and potential of each local community and each local area. Conditions vary so widely and elements peculiar to the social structure and psychology of the local community play so large a part that the approach of cooperative farming must be ever flexible and its forms and practices continuously adapted to local conditions, resources and possibilities.

Landless labour

Even if the necessary conditions for the growth of cooperative farming existed, it could only take us some distance towards solving the deep-rooted problems represented by the existence of a mass of agricultural labour, of whom some may have tiny fragments of land, but many more are completely without land. The size of the problem varies greatly in different parts of the country. In those areas in which agricultural labour represents a substantial proportion,

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plans of economic and social development must provide for them in a far more specific way than has been done so far under the Five Year Plans. The economy of such areas cannot be transformed without transforming at the same time the conditions of life and opportunities open to this large mass of population. It is beyond the capacity of industrial development alone to take a sufficient proportion of this labour surplus into non-agricultural activity, leaving the rest to adjust into a stable and progressive rural economy. All evidence points to the harsh effects of increase in population, the slow growth of alternative employment opportunities, decline in the real wages of agricultural labour and some degree of deterioration in living conditions. A problem of this nature has to be approached simultaneously from several different directions - intensification of agriculture and development of agricultural potentials, change in the system of land management, spread of small industries and rural electrification, building up of a new nuclei of growth, development of economic and social overheads and training facilities and a degree of planning in the movement from villages into towns. In other words, not only has there to be a basic approach to agricultural development and to the growth of industry, but also much greater emphasis on integration between the rural and the industrial and urban economy. In this context, as developments in different sectors are planned and problems inherent in each sector resolved, there has also to be much greater stress on two unifying and integrating concepts, the community and the area. At each level, be it a village, a group of villages or a larger area, the community can play a far greater and more continuous role than has

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yet been realised. How also are resources and energies to be mobilised and concern for the welfare of all expressed? Under Indian conditions, the community and the economy have to grow together. The approach of area development becomes specially significant for guiding developmental efforts in many directions, both those which are planned and those which are spontaneous, towards common objectives. These different objectives are essentially inter-dependent and are best approached so as to produce a cumulative impact upon the conditions and opportunities of the mass of the people.

For Participants Only

AII/11A

SEMINAR
ON
AGRICULTURAL ADMINISTRATION
(March 9-12, 1966)

AGRICULTURAL RESEARCH IN INDIA

By:

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Farm Advisory Unit,
Directorate of Extension,
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INDIAN SCHOOL OF PUBLIC ADMINISTRATION
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AGRICULTURAL RESEARCH IN INDIA

Section I.

Introduction:- The unsuccessful attempts to improve Indian agriculture over a long period of years and by a variety of methods in the last century led to the conclusion that only scientific study of the conditions of farming and experiments to discover agricultural practices that would most suit them would lead to improvements. Among the early attempts that failed may be mentioned the bringing of twelve American Cotton planters, in 1839, by the East India Company, to show how cotton should be grown. Then in 1864 Madras Government imported steam ploughs and a battery of implements to show how the soil should be cultivated but these methods failed. There followed a period of searching for some general policy or system of organisation which would help improve Indian agriculture. The Famine Commission of 1880 followed by a study made by Dr. Voelcker, who was invited to India in 1889 to advise on steps to be taken, led the Government to appoint scientists like Dr.J.W. Leather, an agricultural chemist, to study Indian soils and Dr. C.A. Barber (in 1898) to handle the problem of sugarcane diseases. Thus pressure of events rather than deliberate planning led to the beginning of agricultural research in India. A spurt in this direction was given by the recommendations of the Famine Commission of 1901 and the Irrigation Commission of 1903. Till then agricultural research was hardly a function of the departments of agriculture which were, in many cases, not full fledged departments, being only wings of the Department

area and production of crops rather than with problems of agricultural research or development. The necessity for an improvement in agricultural methods and for agricultural research and no doubt been emphasised by earlier Commissions, such as Famine Commissions of 1880 and 1898, but whatever research was being done was spasmodic and lacked continuity. There was no Department of Agriculture in many of the States and little attempt had been made at building it up on a scientific basis where it did exist.

Establishment of Indian Agriculture Research Institute:-

One of the landmarks in the development of agricultural research inthe earliest years of its history in India was the establishment of a Central Research Institute, orginally called as Agricultural Research Institute at Pusa in Darbhanga District of Bihar in 1905. It was later re-named as Imperial Agricultural Research Institute, and subsequently as Indian Agricultural Research Institute. This Institute moved from its old site at Pusa in Darbhanga District to its present site in New Delhi in 1936.

The Government of India fully realised the fact that a central institution under the direct control of the Central Government could not be very effective in developing agriculture in the entire country unless there was established a number of agricultural colleges and research institutions in the different parts of the country, operating under the administrative control of the State Governments. In pursuance of this policy colleges were started or re-organised at Poona, Kanpur, Nagpur, Lyallpur (now in West Pakistan),

Coimbatore and Sabour. A separate Department of Agriculture was constituted in most States and a scientific staff employed.

The Royal Commission on Indian Agriculture: The different research institutions in the country were engaged in research on certain aspects of crop production but these were ill equipped and staffed and had been left without the stimulus of a central organisation which could guide and coordinate their programmes and policies. It was the Royal Commission on Agriculture, which examined the problems of Indian Agriculture in 1926-28, which emphasised in its report, published in the year 1928, the indispensable part which a central organisation has to play in the fields of agricultural research, and of rural development generally, in the country. Such an organisation should be designed to promote coordination of a more effective character than was available till then through the existing machinery of Government of India and through the Conferences of Ministers and Directors of Agriculture and meetings of the Board of Agriculture. Realising the need for bringing the Central Research Institute at Pusa into closer touch with the State Departments of Agriculture the Commission proposed the constitution of Imperial Council of Agricultural Research whose primary function would be to promote, guide and coordinate agricultural research throughout India. This Council came into existence in 1929 and has, since independence in 1947, been renamed as Indian Council of Agricultural Research.

Indian Council of Agricultural Research was as follows: While research in agricultural chemistry and botany was carried out from an early date in all States of India, research in mycology, entomology and bacteriology was, for many years, restricted to the laboratories of Pusa, Coimbatore and Poona. Many experimental farms devoted to definite problems and more local plant breeding stations were established. The investigations carried out by the departments of agriculture in the States naturally varied with the type of agriculture in the locality in which they operated. In Bengal, rice and jute were the predominant interests, while in Punjab and U.P. wheat and cotton received the major share of research efforts. In Madras and some other areas in Southern India rice was again an important subject of investigation and the early investigations on the chemistry of soils in rice-growing tracts were carried out by the Department of Agriculture, Madras. At Pusa success was early achieved in the breeding of wheat varieties of which Pusa 4, Pusa 12 and Pusa 52 gained wide popularity in large parts of Northern India. Work on linseed, tobacco, gram and pigeon pea also made good progress. Some pioneer work on the physical and chemical problems of the soil and on the part played by bacteria in the maintenance of fertility was carried out at Pusa. Also type collections of India's fungi andinsects were made and maintained at this institute and greatly helped researches on diseases and pests by constituting a good basis for studies on the causal organisms.

The Institute was fortunate to attract, in its early years, scientists of the calibre of Leather in

agricultural chemistry, Butler in mycology, Maxwell-Lefroy and Fletcher in entomology, and the Howards in plant breeding and genetics.

However, although substantial results of practical value had been achieved at some of the research stations, much more could have been achieved if there were coordination and cooperation which were lacking till 1929 when the Indian Council of Agriculture Research came into existence.

Indian Council of Agricultural Research:- Soon after its establishment the Indian Council of Agricultural Research initiated a programme of development of agricultural research at Central and State institutions by helping them in the formulation of research schemes and in financing them from a non lapsing fund of Rs.50 lakhs placed at its disposal by the Government. The powers of the Council were regulated by rules issued by the Governor General in Council in the Department of Education, Health and Lands. At this time there was no separate Ministry of Food and Agriculture, with Departmenrs of Food and Agriculture.

The Council had whole time staff, with a Vice President as the head, who was an experienced administrator with a knowledge of Indian conditions of farming, assisted by two eminent scientists, designated respectively as Agricultural Commissioner and Animal Husbandry Commissioner, representing the interests of agriculture and animal husbandry. They were supported by some technical, administrative and ministerial staff. The Council, consisting of about 100 members, operated through its Governing Body and the Standing Finance

Committee. In the discharge of its functions the Governing Body is assisted by the Board of Agriculture Research, Board of Animal Husbandry Research, Board of Agricultural Development and Marketing and Board of Agricultural Education. On these bodies are adequately represented the agricultural interests of the different States, through official as well as non official members.

In the first five years of its existence the Indian Council of Agricultural Research (which soon came to be more popularly known as I.C.A.R.) devoted considerable attention to the development of sugar industry through sponsoring several research schemes on the improvement of sugarcane by breeding and better cultivation methods. The Tariff Commission and recommended protection to the sugar industry, which was struggling to become viable in face of competition from imported sugar from Java, and the excellent sugarcane varieties, which were coming out of the breeding programme initiated by Dr. Barber and continued under the able guidance of Sir, T.S. Venkatraman at the Sugarcane Breeding Station at Coimbatore in South India, strongly indicated the possibilities of India producing enough sugarcane to become independent of Java sugar. It was the breeding of these canes and their excellent performance in different parts of the country, which were responsible, in no small measure, for the decision of the Government to offer protection to Indian sugar industry. The help which I.C.A.R. gave to promote research on different aspects of sugarcane cultivation was thus both well conceived and timely and has greatly helped the country to occupy the dominant position in sugar industry which it occupies

today. Rice, because of the very large area on which it was grown (nearly 20 per cent of the total cultivated area) and the major share which it contributed to the total food grain production, was another crop which received considerable research support from I.C.A.R.

Although a considerable amount of research was being fostered by the I.C.A.R. it had no research institutes under its immediate supervision until the establishment of the Institute of Agricultural Research Statistics at a much later date. The finances of the Council were spent mostly on research work carried out in Government Institutes of the Centre and the States as well as in some of the Universities who were also invited to send proposals relating to research in those fields for which they were specially equipped or qualified. Financial assistance was offered by the Council also to recognised private institutions.

The I.C.A.R. publishes a number of journals, monographs, bulletins, pamphlets and reports ranging from technical communications for research workers to popular pamphlets for the benefit of the lay man. It also provides various types of audio-visual aids in disseminating useful information. However, since 1958 the more popular types of publications and audio-visual aids have ceased to be the responsibility of the I.C.A.R and are now handled by the Extension Directorate of the Ministry of Food and Agriculture which was reconstituted when the Extension Wing of the I.C.A.R. was separated from the parent body.

The I.C.A.R. has enjoyed considerable success in achieving the improvements and objectives for which

it was established. However, periodical examination of the activities and responsibilities of the Council disclosed a number of deficiencies some of which resulted from insufficient support and coordination of research together with the additional responsibilities for education and development in the different States. That there was a necessity to have the Council's activities periodically reviewed by some disinterested experts was one of the conditions laid down for the establishment of the Council.

Review of the work of I.C.A.R. by Sir John Russell in 1936-37:-

At the end of the first five years of the existence of the I.C.A.R. it was considered desirable to have the current programmes of research reviewed by an eminent scientist from abroad to help Government to decide whether the programmes were well conceived and implemented and the directions in which future programmes should be developed. The I.C.A.R. therefore, invited Sir John Russell, Director of the famous Rothamstead Agricultural Research Station of England, to visit India in 1936-37 to examine the working of the research schemes. His findings are presented in his "Report on the work of the Imperial Council of Agricultural Research in applying science to crop production in India (1937)". This report, while commenting on the good work done by most of the schemes, suggested several improvements and pointed out some gaps in the research programmes. Among the gaps was the comparative neglect by the State and Central Research institutions and stations of two very important groups of crops viz. millets and pulses. Sir John Russell strongly recommended more research on these crops. In the early

forties the I.C.A.R. invited research schemes from the different States for improvement of these crops as a result of which almost all the States were given financial assistance to initiate or strengthen crop improvement research on these crops.

Among other recommendations made by Sir John Russell were the setting aside of a certain fraction of the grants to the Universities for research in subjects allied or basic to agricultural science and practice and for training graduates in research methods. He suggested that the Council should undertake also the task of arranging for the results of research to be put into practice. Specific recommendations were made in respect of wheat, barely, fruits, vegetables, grasses and fodder crops, soil fertility and improved water supply.

Expansion of research activities:-

With the numerous proposals for financial assistance for new schemes and for extension of current schemes which were received by the I.C.A.R. from time to time and with the constant need for scrutiny of the progress of the schemes in operation the I.C.A.R. found it necessary to constitute committees for the needed examination and review. These committees were composed of leading workers in particular fields or on particular crops. The number of crops included in the gamut of the Council's support and the variety of research problems went on increasing. In the course of time another important group of crops, viz. oilseeds, claimed the attention of the Council. With the widespread damage to the wheat crop by the epidemic of 1946-47 the Council directed its attention to a programme of breeding of wheats

resistant to rusts. Researches on agronomic and physiological aspects besides breeding of crops were included in programmes relating to a number of crops. While some of the schemes terminated at the end of the period for which they had been sanctioned, many more schemes were initiated until their number increased to over a thousand. The number of scientific committees of the Council increased to over two dozen. There were separate committees for the following subjects: Botany, Agronomy, Soil Science, Plant Pathology, Entomology, AGRICULTURAL Economics, Agricultural Engineering, Fruits and Vegetables, Rice, other crops, and different animal Sciences.

Central Commodity Committees:- In addition to the sup ort for research which I.C.A.R. offered to the Central and State institutions a substantial part of support on a number of major crops was given by the Central Commodity Committees themselves. Some of these Commodity Committees were established by statute and were empowered to utilise the revenues from a special cess on the respective products, on the basis of processed units. The oldest of these committees was the Indian Central Cotton Committee which had been in existence since 1923. Other Commodity Committees established were for the following commodities:--

Sugarcane, Tobacco, Oilseeds, Jute, Coconut, Lac and Arecanut.

The support for some of these Commodity Committees (for example, jute, Sugarcane, Arecanut and Tobacco) was provided by direct allocations from the Ministry of Food and Agriculture. These Commodity

Committees were established in recognition of the need for special attention to the problems confronting the cotton, sugarcane and other important industries. They have made significant contributions to the technological advancement in their respective fields of work. With their establishment many of the research responsibilities, formerly borne by the I.C.A.R., were taken over by these Committees, such as researches relating to Sugarcane, Tabacco, Oilseeds, etc. With the transfer of crops from the purview of the I.C.A.R. to the various Commodity Committees the coordination of research sponsored by the I.C.A.R. vis-a-vis that sponsored by the Commodity Committees became somewhat lax, and a certain amount of duplication of efforts resulted from the absence of the needed coordination. A major defect resulting from the commodity approach to agricultural research was the neglect of many important problems which transcend commodity fields. Thus inadequate attention was given to problems of soil improvement and management, agricultural engineering, farm management and economics, improved utilisation of agricultural resources, home science and similar similar non-commodity problem areas.

Development of Central and State Research Institutions:

While the Central and State institutions were receiving sizeable financial assistance from the I.C.A.R. and the Commodity Committees for research many of them were being developed almost solely with the help of financial allocations made by the Central and State Governments. Thus the Government of India supported research not only by very considerably expanding the

Research Institute, New Delhi, Indian Veterinary Research Institute, Inzatnagar (U.P.), and Sugarcane Breeding Institute Coimbatore, but also by establishing new institutes dealing with important commodities, such as Central Rice Research Institute, Cuttack; Central Potato Research Institute, Patna (later moved to Simla); Sugarcane Research Institute, Bhadruh, Lucknow; Vegetable Breeding Station, Kulu;, four Central Soil Conservation Research-cum-Training Centres; Arid Zone Research Institute, Jodhpur and Grass and Fodder Research Institute, Jhansi. In the States, besides a main agriculture research station, having a common campus with the State College of Agriculture, which was developed largely with the State initiative, effort and resources, a number of main and branch research stations were established for researches on particular crops. This development was necessitated because the site of the College and the main research Centre of the State was not representative of the area under some of the major crops of the State, The different research sections, whether located at the same centre or at different centres, were placed under the administrative and technical control of research specialists who worked as employees of the State Department of Agriculture. They were assisted by some technical and other supporting staff and operated under the administrative control of the Director of Agriculture directly or through a joint Director or Additional Director of Agriculture (Research). In some States they were placed under the Principal of the Colleges of Agriculture, who was, de facto the Joint Director of Agriculture (Research). The research set up in the State included sections dealing with the different dis-

ciplines or particular crops, such as agricultural chemistry and soil science, crop breeding, agronomy, horticulture, plant pathology and entomology. More often than not crop breeding or improvement was the responsibility of different specialists, operating more or less independently of one another, each concerned with the crop or group of crops assigned to him and variously designated as Economic Botanist or Crop Specialist. The programmes of the different research sections were coordinated by the Director of Agriculture, or by the Joint Director of Agriculture or Additional Director incharge of Agricultural Research, who convened annual or six monthly meetings to review the research in progress and the results achieved and to formulate the programme for the year ahead. In some States the officers who were charged with developmental or extension activities were also associated in these meetings.

The first Joint Indo-American Team on Agricultural Education, Research and Extension:-

Recognising the fact that greatly increased agricultural production is an absolute necessity if India is to attain the objectives of the Five Year Plans and the fact that the key to increased and more efficient agricultural production is a coordinated system of agricultural education, research and extension, the Government decided to develop a project for assistance in agricultural research, education and extension organisations under the Technical Cooperation Programme between the Government of India and the Government of United States. An agreement for achieving

the objective was signed by representatives of the two Governments in 1954. This project provided for various types of technical assistance in the fields of agricultural education and research. As a major phase under this project, a joint Team, consisting of five Indian representatives and three American Specialists in Agricultural Research and education was set up. The Team made a comparative study of the organisation, functions and working of Indian and American agricultural research institutes and colleges. Its recommendations for strengthening the programme of research and education in India were based on the results of this study. The recommendations related largely to problems concerned with financial support of research programmes, organisation at Centre and State levels, and coordination of research among various agencies.

Need for expansion of research was recognised not only for strengthening the research schemes in operation, but also for initiating research in neglected fields. Special allocations of Central funds to the States were recommended on the basis of long-term continuing grants to be used at the discretion of the States for research on the more important problems. The need for continued support of agricultural research by the States for expansion of research facilities to be used by both the State and the Centre personnel was stressed.

In respect of organisation the Team recommended the development of I.C.A.R. as the technical arm of the Ministry of Food and Agriculture for the coordination of all research and related activities supported by central funds. Central research institutes were recommended to

operate under the control of I.C.A.R. and to become the executive arm of the Council. It was recommended that the Commodity Committees should also come under I.C.A.R. administration.

The Team further recommended that a technical staff of high competence, including individuals responsible for each major field, should be appointed in the I.C.A.R. This staff, together with appropriate officers, would constitute a Board responsible for continuing analysis of the overall research needs of India.

Coordinators or leaders were recommended for each major project or field of work. The Coordinator, preferably a senior active research scientist of a Central or State station, would help to bring about coordination of research through stimulating inter-change of working plans and ideas among the scientists in the planning of regional experiments on a uniform basis and in the preparing of joint reports.

The need for coordination of Centre and State research projects was stressed. Recommendations included joint planning of and participation in all regional research, provision by States of laboratory and field facilities for joint regional research and contribution from the Centre of qualified technical personnel.

The Team emphasised the need for establishment of Rural Universities on the lines recommended by the University Education Commission. It envisaged in the beginning the location on the same campus and in close juxtaposition a College of Agriculture and a College of Veterinary Science to which should be added, in due

applied liberal arts and science, a College of Technology using this term in the broad sense of engineering and industries, and with a group of villages to be used as a laboratory for the students. This would greatly help in making the teaching better oriented to the handling of the problems of the farmers because the University would be engaged in research which would seek solutions to the problems of the farmers and will have a responsibility toward the villages attached to the University for extension work. For the development of Rural Universities it was recommended that substantial grants in their aid from the Centre should be made available to the States.

The Second Joint Indo-American Team on Agricultural Education, Research and Extension:-

A second Joint Indo-American Team was appointed in 1959 to assist in the formulation of the Third Five Year Plan by making a comprehensive review of the work in the field of agricultural education, research and extension. This Team was assigned the task of (1) evaluating the progress of work pertaining to agricultural education, research and extension during the previous five years; (2) developing supplementary recommendations with regard to agricultural education, research and extension with special reference to the Third Five Year Plan; (3) reviewing the sisterhood arrangements concluded in 1965 with the five Land Grant Universities of U.S.A. under the Indo-US. Technical Cooperation Programme with a view to find out to what extent they had helped in the development of agricultural education, research and extension programmes in the country and whether they were to be continued during the Third Five Year Plan.

This Team found that the adequacy of the total research programme to meet the needs and demands for improved agricultural products and practices on Indian farms remained as unsatisfactory as before. In fact, the needs for new information required by the growing programme of the National Extension Service of the Community Development Programme made the research output all the more inadequate.

The situation of research in many other respects continued to be unsatisfactory. The research workers of most I.C.A.R. schemes still held temporary posts. The Central Research Institutes had not been organisationally linked with the I.C.A.R. and, as a consequence, were not serving as the effective arm of the Council as envisaged by the First Team. Effective coordination of the Commodity Committee research with that of the Central Research Institute had not been established. The development in I.C.A.R. of a well rounded staff of a specialists in the major problem fields as recommended by the First Team had not been accomplished.

The Team recommended that all the Central Research Institutes and all the Commodity Committee be brought under the full technical and administrative control of the I.C.A.R. Strengthening of the technical staff of the Council on a basis of high priority was emphasised. It further recommended that agro-climatic areas should be demarcated and one major regional station established in each area. In the interest of providing a basis for the improvement of mutual understanding and harmonising working relations between State and Centre personnel at regional research centres and sub-stations of the Central

Research Institutes, the Team recommended that appropriate Memoranda of Understanding, defining specific responsibilities and relationships of the participating agencies and personnel, be developed by the cooperating agencies.

Coordinated Research Projects:-

In the field of breeding improved varieties of the major crops significant advance has been made in the diraction of a coordinated approach involving Central and State research stations. They handle, as it were common programmes, with suitable adjustments to meet local situations, jointly review the data from the different centres of research, freely exchange views and breeding material and formulate programmes for the next season. Necessary coordination is effected by the officer who is designated as the Project Coordinator. The efficacy of this procedure was first amply demonstrated in the case of the programme of hybrid maize and this has been effectively followed in the case of cooperative sorghum hybrid programme, and in the cases of coordinated programmes of wheat and rice. The new hybrids of maize, jowar and bajra have been giving outstanding performances on the fields of farmers, both in national demonstrations established with the help of research and extension workers as well as in commerical cultivation.

Another remarkable development has been in the case of rice breeding where hybridization between selected Indian varieties (indica types) and exotic varieties of Japanese orgin (japonica types) has resulted in the breeding of varieties which have a combination of the desirable characteristics of japonica rices in respect of high yield potential due to high response to

heavy applications of manures and fertilizers without the crop suffering from lodging, and of the grain quality of indica rices. The better standing ability introduced in the hybrids, and their higher response to heavy fertilization, has opened up new frontiers in rice production. Some of the exotic varieties of rice, recently introduced for trials in India, have also given given evidence of high response to fertilizers and are expected to feature prominently in crop production programmes. Among these may be mentioned Taichung Native I, Taichung 65 and Tainan 3. These varieties are among many which are being tested for yield and adaptability in the coordinated varietal trials in different parts of the country.

Excellent work on the breeding of wheats resistant to the dreaded disease, rust, has been done at the Indian Agriculture Research Institute under the able guidance of Dr. B.P. Pal. Coordinated trials with wheat varieties have revealed some varieties having wide adaptability combined with high yielding ability and other desirable features. Special mention may be made of the dwarf and semi dwarf wheats from Mexico which have given very high yields and which are being further improved for grain quality through hybridization with Indian wheats.

PIRRCON Centres:-

Another notable development which sought to make good to a certain extent the isolation from which research on different commodities suffered because of the commodity approach rather than an integrated approach based upon basic needs of the region is a programme of cross commodity research. For this purpose a number of

PIRRCOM Centres (Project for Intensive Regional Research on Cotton, Oilseeds and Millets) were established in 1957-58 for conducting research on basic problems of the region in respect of cotton, oilseeds and millets and for undertaking the study of those problems which could not be taken up at the existing stations. These centres were also designed to provide a machanism to coordinate the work of the different State Research Stations in the regions which they serve. The research programmes of PIRRCOM Centres were guided by the Specialists of the I.C.A.R. and the appropriate Commodity Committees.

Section III.

Agricultural Research Review Team:

Since the First and Second Joint Indo-American Teams did not have the time to go into the details of the research organisation required to get the best out of the amount spent on agricultural research in the country as a whole the Government of India decided to set up a Team to enquire into the existing research set up in the country and to suggest changes in the organisation. Therefore, a Research Review Team was appointed about the end of October, 1963 to consult various individuals and groups at the Centre, in the States and in representative existing research institutions with a view to obtaining a first-hand appraisal of the problems encountered which limited attainment of maximum efficiency and effectiveness in the utilisation of funds and talents devoted to research on problems concerned with agricultural improvement. This Team was also assigned the task of appraising the merits of proposals of the First

and Second Indo-American Teams with respect to changes in the organisation and administration of agricultural research programmes and to suggest changes required in the organisation to bring about a greater coordination between the Central and the State research institutions. It was further asked to prepare detailed proposals and suggestions for the improvement in the effectiveness of organisation, administration and conduct of agricultural research programmes of national, regional and local importance and significance which can be expected to meet the real needs for substantial and sustained improvement in agricultural production and progress.

Among the main observations of the Team are the following Organisation: The organisation of agricultural research in many of the States is going through a radical change associated with the establishment of agricultural universities, which have already been established in Uttar Pradesh, Punjab, Madhya Pradesh, Andhra Pradesh, Mysore and Orissa. These Universities were to assume the responsibilities of agricultural research under way in the States, but in some instances research is still with the State Department of Agriculture.

Research Personnel: A common problem encountered by the Team was a degree of discontent among scientific personnel with arrangements for recruitment and promotion and inadequate career prospects. The temporary nature of the posts offered, low scales of pay compared with those offered for equivalent qualifications and responsibilities in other fields, isolation of research stations leading to absence of suffici[illegible]

scientific communities to create stimulating research environment, and lack of many of the civic amenities came in the way of the personnel giving of their best in their research efforts.

Buildings and equipment:-

Fairly satisfactory buildings have been provided or are under construction. But equipment varies in adequacy from good to poor. Foreign exchange allowance for purchase of essential apparatus from abroad is often very inadequate.

Coordination:- Multiplicity of channels of responsibility and control, and inadequacy of the coordinating powers at the disposal of I.C.A.R. were considered to be the continuing reasons for poor coordination between research being conducted at Central and State institutions. Even the PIRACOM failed to develop as a cooperative venture between the Centre and the States.

Financial and administrative problems:

Budgetary procedures and restrictions were found to be responsible for a great deal of frustration and waste of effort. These have been fully examined and reported upon by the Agricultural Administration Committee (1958). The difficulty seems to arise from an over - centralisation of authority and controls at a point far removed from the level at which research is operating.

Recommendations of the Research Review Team:-

The Team made several recommendations relating to personnel and administration, organisation for coordination and for agricultural production. Among the recommendations is the one relating to the reorganised new Council assuming full technical and administrative control of all Central

Agricultural Research Institutes, all Commodity Committees, and certain other research organisations now financed by the Government of India through various channels.

Reorganisation of I.C.A.R. and the Ministry of Food & Agriculture:-

Under the impact of the different Teams and Committees which examined the problems relating to agricultural research, education and extension and made recommendations on how to improve them and how to handle problems of agricultural development and production the I.C.A.R. and the Ministry of Food and Agriculture are going through a process of reorganisation. Most of the Commodity Committees have been abolished and their functions assumed by the I.C.A.R. and the Ministry of Food and Agriculture. The Ministry of Community Development and Cooperation has ceased to exist as a separate Ministry, and its Departments have merged into the Ministry of Food and Agriculture. There are many other changes in the set up of the Ministry as well as of the I.C.A.R. in order fit them better to discharge the functions necessary both on account of reorganisation and meeting the challenge of food crisis which has been facing the country for some years now.

Section IV.

Soil fertility investigations and soil survey:- The over-cropped soils of India are incapable of giving high yields year after year unless properly manured and fertilized. Local manurial resources being able to supply a very small part of the requirements of the soil for sustained high yields it is essential that fertilizers are used in

adequate quantities. The programme of simple experiments on cultivators' fields, fortified by a concerned campaign of fertilizers demonstrations all over the country, launched under the Indo-U.S. Technical Assistance Programme in 1953-54, began to have its impact on the farmers with the result that consumption of fertilizer began to rise rapidly, increasing almost ten-fold during the last thirteen years. In order to determine the nutrient status of different soils they began to be tested in soil testing laboratories of which there are now 24 and ten more are being established. In addition, a programme of Model Agronomic Experiments has been developed in order to help farmers with correct information on the kinds and quantities of fertilizer to use with different crops in relation to other agronomic practices.

An all India soil survey involving (a) correlation studies to relate the soils in different parts of the country on a scientific basis and devise a suitable nomenclature; and (b) land use survey, has been in operation with headquarters at the Indian Agriculture Research Institute, New Delhi. At this Institute a radio tracer laboratory has been established in 1955 which provides a valuable modern tool for undertaking critical studies in plant nutrition and movement of nutrients from the soil to the plant.

There are many other areas in which research projects have been initiated or are being strengthened in the coming years. Among these may be mentioned the study of soil structure and physics, study of organic matter in relation to physico-chemical and micro-biological changes in the soil designing and testing of agricultural imple-

ments and machinery, soil micro-biology, seed technology, use of radiation and other mutagenic agencies to bring about useful hereditary changes in crop varieties, studies on bacterial and virus diseases, breeding of vegetable crops, nematology, weed control, water use for ensuring judicious utilisation of irrigation, and many other projects. Then there are the schemes on agro-economic research operating at centres located in the different regions of the country. Among other agricultural economics researches are those relating to farm management in selected districts of the country. The Institute of Agricultural Research Statistics of the I.C.A.R. is conducting fundamental and applied research in statistical techniques, standardisation of field experiments of fruits and vegetable crops and analysis of fertilizer trials.

Section V.

An awareness of the causes of the inadequacy of agricultural research programmes has been increasing among the research workers and the administrators alike. The requisites of a dynamic research programme are being spelled out. These relate to system or method of recruitment, conditions of service, salaries and career prospects, training, equipment, financial allocations, administrative procedures, coordination and integration of research, teaching and extension. All of these have been already stated in the above paragraphs. The steps now being taken, in pursuance of the different studies made by study Teams and Committees, will remove the defects and deficiencies of the past. Advice on development and contents of research is being taken by the Ministry of Food and Agriculture

from the newly constituted Panel of Scientists consisting of six of the leading agricultural research workers of India, who meet frequently to examine research proposals and progress. The new Agricultural Universities will be able to bring about the much needed integration between research, teaching and extension, as is being admirably achieved by the Punjab Agricultural University, Ludhiana. The reorganised I.C.A.R., by taking over the responsibility of administration and coordination of researches relating to the different commodities as a result of the abolition of the Commodity Committees, will be able to provide unified direction to research projects and thus guard against isolation or duplication of research efforts. The Central Research Institutes will gain in effectiveness through the establishment of properly staffed and equipped Regional Research Centres. The conditons of service of the research personnel will be improved by the formaton of the proposed all India Agriculture Research Service. A great deal will, however, depend upon the magnitude of financial resources which will be made available for development of research. At present the resources used are meagre, being hardly one-fourth of 1 per cent of our small national income compared to developed countries like U.S.A. and Russia who are spending on research 2 per cent of their much larger gross national incomes. It is hoped that allocations suggested for agricultural research for the 4th Plan would be made available.

Section VI.

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For Participants Only

AA.II/11B.

SEMINAR ON

AGRICULTURAL ADMINISTRATION
(March 9-12, 1966)

AGRICULTURAL EDUCATION IN INDIA

By

S.K. Mukerji
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Agricultural education in India has not made much headway, in spite of the fact that agriculture is the occupation of a majority of the people. The small size of family holdings does not give sufficient scope for employment of highly trained member of the family on the farm. The small numbers of people employed by Government agencies for research and extension, the almost total absence of private agro-industries like seed production or manufacture of agricultural inputs the low remuneration of agricultural scientists as compared to administrators, general scientists and professional men in other fields are some of the cogent reasons for students of poor calibre of students studying agriculture. For a proper impact on agriculture some of the glaring defects in the system of agricultural education will have to be remedied and a coherent pattern of agricultural education with well defined objectives from the farmer's level to the highest university stage.

Agricultural Education below College level:

At present agricultural education below college level consists of teaching agriculture as one of the craft subjects in primary and middle schools, as an optional or stream subject in secondary or multipurpose high schools, as a vocational subject in manjri type of agricultural schools at pre-or post high school level and Gram Sevak Training Centres.

Elementary School:

At the primary stage agriculture craft serves as a vehicle for ecological orientation of general education. Under the integrated basic education pattern agriculture can be conveniently worked into work-experience which is one of the

essential objectives of the national system of education. The agricultural content of rural primary schools is thus limited to an orientation of the basic courses towards understanding of life of plants, animals and problems of local community. The School garden needs to be adequately developed for instructional purposes and teachers properly trained for agricultural craft teaching.

High School.

The multipurpose higher secondary schools were established on the recommendation of the Secondary Education Commission (1952) mostly by upgrading existing secondary schools. Their main aim is to provide in the secondary schools diversified courses like agriculture, commerce and other practical courses which would help students to take up vocational pursuits.

Old secondary schools continue to offer agriculture as an optional subject of study. The course offered is of a very elementary nature providing only an introduction to the subject.

There are over 500 multipurpose high schools in the country with agricultural stream representing about 25 per cent of such schools. This experiment has not been successful due to lack of basic physical facilities, dearth of trained agricultural graduate teachers and effective curricula which is neither preparatory for agricultural college nor for farm work. The agricultural college bound youth would require a more sound training in basic sciences and a terminal vocational course would have to be better oriented towards intensive practical farm training than is provided by multi-purpose schools.

The present thinking is that the period spent in high school should be utilised for imparting a sound general education with particular emphasis on mathematics and sciences. Agriculture as a subject at vocational level may be taught after Class X in junior colleges or vocational schools after sound general education has been obtained.

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Agricultural Vocational School:

Manjri type of schools provide vocational training in agriculture for 2 years after Class VII education. The original manjri type of schools were started in Bombay State in 1947 with a view to provide opportunities to farmers to have their sons trained in scientific agriculture. Instruction is provided in the local regional language. A large number of students in rural areas drop out after middle school stage and they could be channelised towards this trend of vocational agricultural education. During the 3rd Plan, a proposal was made to start manjri type of schools in other States. But not much headway has been made in most of the States. In some of the States, particularly in Madras, a different type of school is being developed in each district farm offering a year's practical training to farmers' sons of age group 18-30. The cost of board and lodging is met by Government. A similar instruction is being developed in Punjab by Punjab Agricultural University as part of its extension activity.

Rural Institutes:

The University Education Commission (1948-49) had suggested general advancement of rural India through a system of rural colleges and Universitites. Ministry of Education established 10 rural institutes instead of rural universities in 1956 converting some existing institutions which had done pioneering work in education. The number has now gone to 14 out of which 7 offer certificate course in agriculture in addition to diploma courses in rural services, rural engineering, etc. Agricultural course approximates the level of training imparted at Gram Sevak Training Centres. In the actual implementation of the scheme, certain drawbacks were noticed. As diplomas and certificates of these institutes were not recognised by many State Governments for employment and for further studies by Universities, enrolment in different courses were very low. In 1963-64, there were only 2880 students in 14 rural institutes.

University Grants Commission has agreed recently to grant groups of these institutions university status to remedy some of these drawbacks. But on the whole these institutions have not contributed significantly towards agricultural education.

Agricultural polytechnics:

There are few institutions available in India which offer various types of post or pre-high school courses in agriculture at Diploma or certificate level under one roof. Few State Governments like U.P. started 2-year Diploma Courses in Agriculture to train their junior staff to man a large number of middle level personnel for posts which did not require an agricultural graduate. In the wake of the community development programme in 1952, 100 Gram Sevak Training Centres were started on ad hoc basis to train matriculates. The period of training which was 9 months initially has been now extended to 2 years, covering an integrated course of agriculture and extension. With the present advancement in agricultural technology it has been generally accepted that with the present level of training Village Level Workers are not able to win the confidence of farmers with their technical know-how. Their training period is being increased by one more year at selected 80 advanced Gram Sevak Training Centres and Short-courses for farmers are at present organised on an ad hoc basis. There are no institutional organised short courses offered for farmers or farmer's sons who may like to learn certain skills or trades during off-seasons in different fields of agriculture for self-employment rather than for Government jobs.

It is contemplated to recommend establishment of a type of institution which may be designated as Agricultural Polytechnic. In addition to preparing intermediate level personnel who will form the link between the research workers on the one hand and farmers on the other, the Agricultural Polytechnics will also have to prepare the technicians needed by the existing and

developing agro-based industries and also create avenues for self employment. These institutions may offer a whole series of courses leading to certificates and diplomas to cater for several trades in agriculture. The diploma courses may be of 2-3 years' duration and concentrated short term courses for equipping practising farmers with specific skills may last for a few weeks. These could be located near campuses of Agricultural Colleges or Agricultural Universities or regional or central research institutes, so as to spare staff and scarce physical facilities. Some of the existing Gram Sevak Training Centres with adequate facilities could be converted into polytechnics with little additional expenditure.

As extension services develop and more avenues for self-employment in rural areas are created, demand for specific training from practising farmers may be expected to increase. A very large number of such institutions will be needed to cater for these needs. To start with 100 may be set up during 4th Plan with Central assistance and located in each agro-climatic region of each State.

Agricultural Education at College level:

Undergraduate colleges- The first Agricultural Colleges in the country were established in 1907 at Poona, Nagpur, Sabour (Bihar), Coimbatore and Kanpur. These offered diploma courses in Agriculture. Later these institutions were upgraded to degree level and affiliated to Universities.

In 1949, there were 17 institutions of higher education in agriculture offering degrees with a total enrolment of about 1450 per annum, which represented about six students per million of the farming population. At the time of implementation of First Five Year Plan, acute shortage of trained agricultural graduates was faced. The opening new colleges and the expansion of the existing ones provided for the doubling of the enrollment in agricultural colleges by 1957-58. The extreme shortage of agricultural

graduates to need for them led to a mush-room growth of private agricultural colleges in the U.I. and the total admission capacity in the country shot up steeply to 5600 by 1960-61. The number of colleges has been rising since then and is now 70 with an admission capacity of over 9000 students per year. This includes the constituent colleges of the 8 new agricultural universities.

The existing colleges can be categorised under following classes:

(i) Colleges wholly run by State Governments.

(ii) Colleges operated as Departments of Universities.

(iii) Colleges run by private organisations.

Colleges under the first two categories usually have the minimum facilities for training of undergraduates but need further improvement. But most of the colleges falling under category (ii) which train about 40 per cent agricultural graduates in the country are sub-standard and would need considerable investment of funds to bring them up to at least minimum standard prescribed. Effective steps will have to be taken to regulate admission to mushroom private agricultural colleges particularly in U.I. Universities might be requested to be more careful in granting affiliation to new colleges.

Except West Bengal and Madras where there is a large deficit of trained personnel no new colleges are needed in other States during 4th Plan. The enhanced requirement of personnel of other States could be met by increasing number of admissions in the existing institutions by providing adequate facilities. It has been estimated that expansion and improvement of training facilities will cost Rs. 6.5 crores during 4th Plan, out of which a provision of Rs. 4.5 crores has been proposed in the Central Sector.

It has been agreed that the first degree in Agriculture should be after four years' study following 12 years' schooling to impart a solid background in the sciences.

Agricultural graduates are often criticised that they do not have practical knowledge and their training is too bookish. There is some truth in such statements which is perhaps applicable in some measure to all aspects of the Indian education system compared to the education in the developed countries. The suggestion often made that with the introduction of more manual labour in the field during the college course, it should be possible to produce practical farmers, is not always feasible. It is also true that in the other professional fields like medicine or engineering graduates are made to undergo house-surgeonship or apprenticeship as a part of their training. It is necessary to provide practical training facilities to agricultural graduates on Government farms or in the farms of progressive farmers, specially those who are taking up farm management as a profession.

To provide incentives to meritorious students to take up agricultural studies, 250 scholarships per year were offered to undergraduates. It has been planned to cover 5 per cent of total admissions to the agricultural colleges with such scholarships during 4th Plan. In many States State Governments offer scholarship to students with first division marks who join agricultural or veterinary colleges.

Most of the text books required for higher agricultural education have to be imported from Western countries. Text books on agriculture and animal husbandry which have been written with reference to another agro-climatic region will not give the student the necessary basic facts on which he can proceed to apply his knowledge to conditions that he would meet in a job. The experienced staff of agricultural Universities and Central Institutes who have both teaching and research integrated should be in a position to break new ground in the field of text book production with the help of liberal terms of text book scheme of I.C.A.R.

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Agricultural Education at post-graduate level:

Though agricultural and veterinary colleges as institutions of higher education have been in existance from the beginning of the century, actual recognition of few of these instutitions as post-graduate training centres leading to degrees of M.Sc. and Ph.D. was obtained after 1930. The Indian Agricultural Research Institute initiated in 1923 a post-graduate course leading to the diploma of associateship. But the major development in post-graduate studies took place after the launching of Second Five Year Plan when acute shortage of post-graduate trained personnel was felt. Indian Agricultural Research Institute was reorganised into a Post-graduate School in 1958 having university status awarding M.Sc., Ph.D., degrees in various fields of agricultural services. It was recommended by 2nd Joint Indo-American Team that one post-graduate institute should be developed in each State. But it was observed that very great pressures from the regional interests in the States developed to upgrade the existing under-graduate institutions to post-graduate status. Such a multiplication of post-graduate institutions has led to the lowering of standards as library and laboratory facilities, and qualified and experienced staff could not be increased sufficiently with their limited resources. The Second Indo-American Team particularly noted this deterioration in standards and recommended that before any college is permitted to set up post-graduate courses, an inspection team of experts appointed by the I.C.A.R. should get the facilities and competency of the staff examined. But in actual practice since Indian Universities are autonomous bodies with full liberty to grant affiliation and confer degrees and the Indian Council of Agricultural Research is not armed with statutory powers in respect to higher agricultural education like the Medical Council for medical education, the proposal for inspection could not be enforced.

However, it is learnt that it is under active consideration

that Indian Council of Agricultural Research be armed with statutory powers to enforce accreditation to maintain standard of higher agricultural education effectively.

The present capacity of 30 post-graduate institutions including the Indian Agricultural Research Institute and constituent colleges of Agricultural Universities, is 1200 per year. This will be sufficient to meet the need of post-graduate trained personnel required for 4th and 5th Plans for education, extension and research. Instead of increasing the number of post-graduate institutions, it is now proposed to concentrate on improving the quality of post-graduate training by integrating teaching and research andproviding adequate funds for development. In future expansion it is visualised to increase the number of post-graduate subjects in post-graduate institutions and to develop some of the existing post-graduate departments in agricultural universities and already established post-graduate colleges in the country as centres of advanced studies in certain fields with training facilities leading upto doctorate level. These will be based on the pattern of Advanced Centres in some basic science and humanities subjects started by University Grants Commission. It is proposed to provide Rs. 2 crores in the Central Sector during the 4th Plan for development of post-graduate education in Agriculture in 17 post-graduate institutions which are not constituent units of Agricultural Universities.

Agricultural Education for farmers and extension workers:

Farmer's training-

Progress in agriculture ultimately depends upon the acceptance and adoption by farmers of improved agricultural technology in order to transform traditional agriculture to modern scientific agriculture. Appropriate system of education for the farmers is one of the prime requisites to achieve this. This education has two fold purposes; first is to promote among farmers modern scientific attitudes to

life and knowledge. The second is to communicate to the farmers new knowledge and constantly funnel to them the latest farm research findings. Agricultural education through the formal system of agricultural high schools, Gram Sevak Training Centres, agricultural vocational schools and agricultural colleges will be available specially to sons of farmers. But the number of persons that may be trained through this system is likely to be very small in the near future and large majority of such trained persons may be absorbed in government agricultural services and in private industry. Even if a farmer has received a certain amount of formal agricultural education, it has to be continued to keep his technical knowledge up-to-date in order to bring it closer to his practical farming needs. Thus agricultural education for the farmers is primarily an adult education process and must, therefore, go beyond the system of formal education.

Majority of the farming adult population is illiterate; hence inculcation of improved methods and practices can be achieved effectively by demonstration. Radio talks can be another agency to supplement this. They are unwilling to risk the uncertainty of the result inherent in applying new factors or methods of production since even a single failure could be of critical importance for their survival. Extension agency must have confidence enough in its recommendations to be in a position to insure the cultivator against any loss, should such loss occur by adopting the improved methods. They should have the backing of sound research on which to base their recommendations. Further they should be able to support the recommendations by actual demonstration on large scale. To achieve this, a close relationship between education, research and extension is essential.

The agricultural extension service as it has developed over the last 14 years meets this purpose to a limited extent only.

It is stated that there are some 60 million farmers in 5131 blocks in the country. Assuming that the blocks are uniform in size, there are roughly 12000 farmers in each block served by 10 Village Level Workers. It works out to one Village Level Worker serving over 1000 farmers, which is too wide a teacher to taught ratio to be effective for even adult education purposes. Both in technical and professional competence and numerical strength, the present extension service is quite inadequate and is likely to so remain for some time to come, to reach a sufficiently large number of farmers.

Whatever the formal educational qualifications of the extension men, they appear to be not very effective as educators. The present day extension service consists in the main, of an agency for promoting and administering a large number of official development schemes. The technical knowledge one requires for this purpose consists usually of administrative details of the schemes of supplies of inputs, of loans and subsidies available under them. Hence a competent technical person functioning in this service is apt to lose his technical competence soon. If the extension service is to function as an agency of continued adult education of the farmers, and if for this purpose the technical competence of the extension men is to be preserved, it is essential to separate the extension service from the programme of administration and place it closer to agricultural education. The agricultural universities are expected to take up this extension education responsibility in a phased manner all over the State in close cooperation with the present extension agency, who may continue the service and supply functions.

With this object in view, a number of training programmes for the farmers have been initiated by Central Government during last 2-3 years and would be pursued vigorously during 4th Plan. The salient ones are as follows:-

life and knowledge. The second is to communicate to the farmers new knowledge and constantly funnel to them the latest farm research findings. Agricultural education through the formal system of agricultural high schools, Gram Sevak Training Centres, agricultural vocational schools and agricultural colleges will be available specially to sons of farmers. But the number of persons that may be trained through this system is likely to be very small in the near future and large majority of such trained persons may be absorbed in government agricultural services and in private industry. Even if a farmer has received a certain amount of formal agricultural education, it has to be continued to keep his technical knowledge up-to-date in order to bring it closer to his practical farming needs. Thus agricultural education for the farmers is primarily an adult education process and must, therefore, go beyond the system of formal education.

Majority of the farming adult population is illiterate; hence inculcation of improved methods and practices can be achieved effectively by demonstration. Radio talks can be another agency to supplement this. They are unwilling to risk the uncertainty of the result inherent in applying new factors or methods of production since even a single failure could be of critical importance for their survival. Extension agency must have confidence enough in its recommendations to be in a position to insure the cultivator against any loss, should such loss occur by adopting the improved methods. They should have the backing of sound research on which to base their recommendations. Further they should be able to support the recommendations by actual demonstration on large scale. To achieve this, a close relationship between education, research and extension is essential.

The agricultural extension service as it has developed over the last 14 years meets this purpose to a limited extent only.

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With this object in view, a number of training programmes for the farmers have been initiated by Central Government during last 2-3 years and would be pursued vigorously during 4th Plan. The salient ones are as follows:-

(i) Specialised training of selected progressive farmers in agriculture and allied fields.

(ii) Training of farm women in agricultural production.

With the level of growth of agricultural extension and community development and the problems thrown out in the field, it was quite essential that a supplementary trained task force was created in the rural areas by way of giving higher training to those who were mainly interested in adopting improved agricultural technology and had shown leadership in the field of agriculture, serving as models for other farmers to emulate. The scheme is being operated at Gram Sevak Training Centres, agricultural Colleges, Government Farms where adequate facilities for practical type of training to meet needs of farmers exist. The courses last for 10-15 days for a batch of 40. It is expected to train 40,000 such farm leaders per year to supplement extension education functions of block extension personnel. This programme is functioning in intensified form for shorter duration in intensive production programme areas in batches of 15 at the rate of 3 farmers from each village. The total cost of this farmer's training programme during 4th Plan is estimated to be Rs. 470 lakhs.

Training of farm women is as important as that of training of farmers. A training scheme has been introduced for women in blocks where Gram Sevika Training Centres are situated and results are quite encouraging. 2,000 farm women have already been trained. This educational programme is being extended to intensive production areas.

Some State Governments have formulated massive training scheme for farmers. For example in Maharashtra training of farmers is being done through two peripatitic teams in each district who hold 4 camps in various parts of the district every month. 24 camps are held by each unit training 50 farmers at a time. Thus 2400 farmers are trained in each district per year, i.e. 60,000 farmers in 25 districts of the State.

Similarly 8 short vocational courses of 15 days duration in each district per year have been planned to train 400 farmers. This means in a year 10,000 farmers will receive vocational training in specific fields.

It has now been realised by the planners that without education of the farmers in scientific agriculture, it will not be possible to increase agricultural production simply by making inputs readily available. The farmers are keen to learn the technical know-how. It is proposed to train at least 10 per cent of the 60 million farming families by the end of 4th Plan so as to bring scientific agriculture to their doors.

Training of extension workers:

So far 144 institutions have been set up throughout the country for training Gram Sevaks and Gram Sevikas, respectively. By the end of 3rd Plan they would have trained 77,000 Gram Sevaks and 9,300 Gram Sevikas. Training period of Gram Sevaks has increased from 6 months to 2 years. Now the curriculum consists of an integrated course with major emphasis on agriculture and allied subjects and extension education. Now that pre-service training phase is almost over, the main emphasis during 4th Plan will be on qualitative improvement in training. It is an admitted fact that present Village Level Worker has to be raised in his technical competence so that he could advise progressive farmers. Three pronged approach is proposed to be undertaken:-

(i) Such V.L.W.'s who are eligible for admission to agricultural colleges to obtain B.Sc. (Ag) degree will be encouraged to do so. 2,500 VLW's are expected to be covered under this programme.

(ii) Starting one year Diploma Course in agriculture for VLW's by upgrading all the 100 Gram Sevak Training Centres by the end of 4th Plan. 21,500 VLW's are expected to be given such higher

(iii) Intensification of refresher's training programmes. Regular 2 months refresher's courses will be run at all the 100 Centres so that each VLW gets a chance to attend it.

In addition, intensive effort will be made to improve the quality of instructors by giving them courses at 4 extension education institutes and colleges, of Agriculture and Veterinary. 555 such trainers have been trained till 1965.

Similarly, arrangements are being made to provide subject-matter and extension training, to the extension officers in agriculture and animal husbandry. Under this programme, so far 6,200 extension officers have received training in subject matter and 480 in extension methods.

A beginning is proposed to be made during the 4th Plan by organising specialised training courses for short duration for the regional and State level officers either in their subject matter or in extension methods and techniques.

Integration of Education and Research:

The Director of Agriculture in the State has the responsibility for research and education activities. In the early part of the century when first State agricultural colleges were established, the State level research specialists used to head the college and its different departments as Principal and Professors. This led to some extent of integration of education and research. The research staff in taking up teaching work had to keep themselves abreast with the latest progress in their fields of specialisation. But as number of colleges multiplied, and the number of students increased after independence, this arrangement was changed in most of the States by appointment of whole time Principal and Professors, to cope up with the increased volume of work. Similar was the situation in most of the private agricultural colleges where research work was in its infancy. Though this arrangement was conducive for under-graduate teaching, but led to more or less divorce of research

from teaching. The colleges were reduced to teaching shops with teachers deprived from stimulus of research. Effective teaching in applied fields can be accomplished only through ~~a constant process~~ of revising contents of courses by incorporating the latest research findings.

For post-graduate institutions integration of teaching and research is absolutely essential, as thereby post-graduate students get excellent opportunity of continuous contact with research specialists. They get wider range of assistance from specialists in conducting research for their thesis, both in physical facilities and in academic matters. Specialists also mutually benefit by such association by getting many aspects of research problems worked out by post-graduate students.

First Indo-American Team recommend that to ensure maximum coordination and supervision in research and education, responsibility of those technical fields at the State level should be assigned to a Joint Director, who may be the Principal of the premier agricultural college of the State. At subject matter level the State specialist should act as the head of the Department for both research and education. This arrangement provides for competent technical advice to Director of Agriculture and avoids development of separate lines of responsibility for teaching and research found in number of States.

Madras was the first State to adopt this recommendation and many others are adopting it in modified form. In the States where Agricultural Universities have been organised, all the 3 wings, i.e. research, teaching and extension education are being integrated to the closest extent.

Punjab Agricultural University may be quoted as the model in this respect. The University Professor of a particular department is not only responsible for teaching in the subject at all the campus, but also research in the field at all research stations

and for university employed subject matter specialists in the subject placed with the District Agricultural Officers for extension education work in the districts.

Place of Agricultural Universities:

The urgency of bringing about a rapid increase in food production necessitated a re-examination of the existing patterns of agricultural organisations serving Agriculture. It was apparent that there was need for establishing closer inter-relationship between research, teaching and extension programmes. The concept of the Agricultural University has been developed with these aims in view.

The traditional universities have handled the training of agricultural graduates in affiliated colleges and the departments of agriculture and community development have the programmes of research and extension activities. Liaison between these 3 agencies has been rather poor. Now there are 70 Agricultural Colleges and 18 Veterinary Colleges in the country; majority of them are State institution and some of whom are managed by private agencies. The agricultural training programmes were not linked with research in experiment stations and extension organisations under these universities; as such various expert committees commented adversely on performance of such graduates. They were of the view that until the programmes are overhauled and reoriented, it would not be possible to meet the needs of the actual cultivator and to attain country's goal of self-sufficiency in agricultural production. Trained agricultural graduates would form the key personnel through whom the sum total gained through research and working in fields has to be exploited for effecting a significant increase in agricultural production.

Broadly the Agricultural Universities follow the following guide-lines:-

1. The University should have State-wide responsibility

in agricultural research, teaching and extension education.

2. Agricultural University should have as constituent units all state colleges of agriculture, veterinary and animal husbandry, home science, agricultural engineering and a school of basic science and humanities.

3. Research, extension education programmes in the agricultural sciences should be fully integrated with the teaching functions through the agricultural university.

4. The Agricultural University should be an organisation devoted to the educational problems of the rural people to develop leadership, increase production, and generally improve the standard of living.

5. The curricula and training programmes should be modelled in a manner as to be in keeping with the needs of the State on the one hand and of the aptitudes and needs of the individual students or trainees. This involves formulation of curriculum. Evaluation of students will be done by teachers themselves instead of traditional external examination system.

Planning Commission has accepted that Indian agriculture could be raised to level comparable to those of advanced countries if agricultural education of the traditional type is to be replaced by one which is adequately linked with research and extension and in relation to the complex and changing problems of the vast body of cultivators.

One Agricultural University was set up in the 2nd Plan at Pantnagar in U.P. New universities were set up during 3rd Plan in the States of Punjab, Rajasthan, Madhya Pradesh, Andhra Pradesh, Orissa, Mysore. Kalyani University in West Bengal was recognised as Agricultural University. The Agricultural Universities will have to serve as centres from which latest knowledge in agriculture will flow out. All the different aspects of agricultural education should have a close link with Agricultural

Universities.

A token provision of Rs. 2 crores was made to develop them during 3rd Plan. The total requirements of 8 universities to grow to full stature encompassing research, teaching and extension education responsibilities of the respective States were estimated at Rs. 115 crores. For developmental activities, assistance on the pattern of University Grants Commission will be offered to these universities by Ministry of Food and Agriculture through reorganised Indian Council of Agricultural Research, for which Rs. 29 crores has been ear-marked. 2-3 more such universities may be started in other States during 4th Plan. It is ultimately proposed to establish one such Agricultural University with multi-disciplinary approach per State.

In the initial stages, more attention is being paid by Agricultural Universities to research in agriculture, veterinary science, and animal husbandry. Research on some of the basic sciences, agricultural economics and sociology will follow. As the State Research Stations are being transferred to the Universities for administration, existing personnel and programmes are not being much disturbed. The Universities appreciate the fact that the successful development of research programmes in the new universities is basic to their becoming effective teaching, research and extension institutions.

The responsibilities of extension education vary to some extent among the States. Ultimately it may involve total responsibility for extension education work in 8 States. At present, it involves responsibility for education and training including refresher's courses for extension workers and farmers at different levels. There are extensive arrangements in some universities for offering short courses for groups of farm producers and of youth at the non-degree level both at University campus or at research farms. Demonstrations are being conducted both in

University farms and farmers' fields. Students are involved in extension work in villages as a part of their training. Agricultural universities are playing a key-role in developing the information upon which effective extension education is based and in educating and training the personnel who are to develop and disseminate the information.

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For Participants Only

AA.II/12.

SEMINAR
ON
AGRICULTURAL ADMINISTRATION
(March 9-12, 1966)

A POLICY ON FOOD

By

Dilip Mukerjee
Shoy Lall, Correspondent of the Statesman
and
M.B. Lal

(The Statesman, 3rd March, 1966).

INDIAN SCHOOL OF PUBLIC ADMINISTRATION
Indraprastha Estate
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THE outlook on food in India is of continuing shortages, not because of stagnation but because of growth. Over the past 15 years, food production has increased by 49% and population by 36%, but the gap between demand and supply has widened because of increasing money incomes.

Since development spending must continue, the pressure of growth-induced demand will persist. Assuming that the new agricultural strategy succeeds--as it must--the gap can be closed only by the early 70s.

In the meantime, India will have to cope with shortages, specially in the lean years-two out of five. The following recommendations for a food policy are presented in this perspective.

(1) Consumption must be curbed by both fiscal and physical means.

Fiscal curbs imply restraining the increase in money supply. This means, above all, avoidance of deficit financing for development until the price situation has been brought under control.

Physical curbs mean reducing effective demand by rationing. Since India's size makes nation-wide rationing inconceivable, the rationing in cities--pockets of high purchasing power-is the only solution. This should protect not only the consumer within the rationed areas but also those outside it by insulating

In other words, urban rationing offers hope of regulating both the controlled and open markets. Statutory rationing now obtains only in Calcutta, Madras, Coimbatore and Delhi; while other places have informal rationing under which cereals are issued through fair price shops with or without cards but an open market also operates. In order to make the cordoning off of deficit pockets complete, informal rationing of cities has to be converted into statutory rationing as rapidly as possible.

(2) The extension of rationing must depend upon effectiveness of procurement.

Rationing implies a commitment to supply a uniform quantity week after week. No Government can be expected to take on this commitment without stocks in hand. PL 480 wheat supplies make the task much easier in wheat but in rice we have largely to depend upon ourselves: rice imports last year were under 2% of the domestic output while wheat imports worked out to about 50%. With larger commitments for supply of rice under extended rationing, the Government must explore the possibilities of trade agreements with Burma and Thailand which would provide imports of rice on barter terms or for rupee payment.

(3) Procurement will have to be compulsory but not coercive.

Procurement by buying at the prevailing rate in the open market is not feasible in the present situation of extreme shortage, except for a few weeks immediately after the harvest. Only a small portion of the crop comes to the market in these weeks; a system of levy is inescapable to get at the rest.

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The levy should be imposed direct upon the producer, graded by the size of his holding. Existing channels of trade need not be put out of commission; they can be retained to work on behalf of the Government as its agents under adequate supervision.

(4) Procurement has to be on an all-India basis.

If rationing is to be extended, the supply requirements will be too large to be met by what surplus States can spare. Even deficit States have surplus pockets like Burdwan in West Bengal and Palghat in Kerala; there is no reason why these should escape the net. The aim should be to realize a levy from every farmer operating holdings above a certain minimum size.

(5) Procurement prices must preserve incentive to grow foodgrains.

Low prices, leading to shortfalls in procurement, hurt consumers more than better prices paid to producers from the start. It is necessary to make a clear distinction between minimum floor prices set by the Agricultural Prices Commission and the operational price for Government purchases. A price which is right at the beginning of the season is not necessarily so as the season progresses.

(6) Monopoly procurement will not work.

Attempts at monopoly, or near monopoly, under which Governments take the right to acquire most of the marketed surplus will be self-defeating. Resistance offered by farmers may become unmanageable unless they are left a part of the crop to dispose of; how much is left will depend upon the size of the Government's supply commitments. To attempt too much, either in terms or procurement or supply, is to invite risk of

the consumer is thrown into panic by a breakdown of Government's plans to protect him.

(7) With effective procurement rationing network must be enlarged.

With confidence arising from stocks in hand, States must go ahead with the programme of rationing already agreed upon; cities with a million or more population in the first stage, cities of 300,000 or more in the second and finally all cities above 100,000. Eight cities inhabited in all by 17 million people fall in the first category and account for a fifth of the total urban population; coverage in the second stage will extend to 26 cities with 25 million people or 32% of the urban total. In the final stage, 116 cities with 31 million people or 40% of the total urban population of 78 million will have been covered. (Population figures here are for 1961.)

(8) As the rationing network is extended, zonal restrictions should be progressively reduced.

Zones cannot be scrapped before procurement has been put on a sound basis. To agitate for their abolition without making sure of other means of getting at surplus produce is to put the cart before the horse. When pockets of purchasing power have been cordoned off, movement of grain can be freed without danger to surplus areas. Relaxation of wheat zones can start as soon as the stock in hand in the main consuming centres is adequate to deal with any unexpected results of relaxation of zonal arrangements.

(9) Imports must supplement domestic output for the present.

Even though imports account for only 8 to 10% of the total availability in less desperate years than the present. They are vital for maintaining

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price stability. Even when rationing has been extended to all cities above 100,000 population, it will cover only 8% of the country's population. Political stability will be impossible to maintain if large development spending adds to the pressure on prices in a situation of shortage.

(10) Production effort must be concentrated where it will do most good.

India is short of both time and resources: hence the need to put the maximum effort into special areas where the application of new technology will yield the biggest and most assured results. These areas, either already irrigated or with assured water supplies, will be reasonably immune from the vagaries of the monsoon. Startling increases in production are possible with intensive farming; even a limited area can yield decisive additions to the food supply. As it is, only 58 districts produce 48% of the marketed surplus.

(11) The special programme must be given everything it needs including foreign exchange.

Improvement in productivity--the only way open to India for raising additional food-depends upon the country's ability to supply the grower with the wherewithal of scientific farming--among them water, power, fertilizer, plant protection chemicals, efficient implements and credits. As long as supply from domestic production falls short, imports will have to be arranged. This will call for a firm commitment to allocate the necessary foreign exchange.

(12) The needs of agriculture should determine industrial priorities in the Fourth Plan.

Local manufacture of fertilizers and other

policy decisions so that the exchange required for plant and equipment is readily secured. The second step--this will also have to be taken early in the Fourth Plan--is to equip ourselves to make the plant and equipment within India to insulate future advance from foreign exchange uncertainties. Priorities within the capital goods sector should reflect the overriding claims of agriculture.

(13) Administrative arrangements for agriculture need review.

Arranging supplies will not be enough; it may be necessary to create a centrally-supervised, all-India task force of administrators and specialists to ensure that local defaults or indifference do not hold up the programme for special areas.

(14) The special areas must set a model for the effort elsewhere in the country.

Farm practices successfully developed in the special areas should be adopted elsewhere. These could set an example for the whole country about the way in which credit is organized for unsecured tenants, landlords discouraged from appropriating too large a share of the gains, the marketing of produce protected from sharp post-harvest dips, and close links developed between farm and factory by setting up agroindustries to serve local needs. These special areas must become the catalysts to change the countryside.

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For Participants Only

AA III/1

SEMINAR ON

AGRICULTURAL ADMINISTRATION

(March 9th-12th, 1966)

THE INDIAN CONSTITUTION AND AGRICULTURE

By

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INDIAN SCHOOL OF PUBLIC ADMINISTRATION
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THE INDIAN CONSTITUTION AND AGRICULTURE

H. W. Hannah

July, 1957

India has a new constitution and an old agriculture. What will be the impact of the new constitution on problems which will arise as agricultural production is increased and transportation and communications improved ?

To answer this question, one first needs to know what provisions the constitution contains that have a bearing on agriculture. One might say that indirectly at least all of its provisions have a bearing on agriculture. Admitting this the next enquiry then should be aimed at determing what provisions are most likely to be important to the agricultural economy. Certainly for example provisions affecting land tenure and the holding and division of agricultural lands and the revenue from agricultural land; provisions on the inter-state movement of agricultural products, on the transportation of agricultural products, on the control of animal and plant diseases are all problems of importance which have constitutional implications. In this paper are listed and discussed those provisions which meet the writer's estimate of what is likely to be important to agriculture. Admittedly his judgement is biased by a preponderence of experience with American laws dealing with agricultural problems.

On studying the constitution of India <u>one is struck more by resemblances than by differences</u>. There are some important differences of course, particularly in point of departure. But ultimately it is likely that many of the problems which have a constitutional bearing will be solved very much as they have been in other countries. For example I am certain that through all legal and legislative systems

then a local law is no longer adequate to cope with it and a larger authority by some means or other is permitted to take over. This authority of the larger entity may arise in several ways. It may have been thought out before-hand and provided specifically like for example the items in the Union list of schedule 7 to the constitution; it may have been left to implication or it may have been given the higher authority as a part of its residuary powers. Sometimes it even may arise by default. At any rate before getting into the more direct and specific provisions of the constitution which have a bearing on agriculture it would seem that the first line of enquiry should be directed at finding and stating at least in general terms what seems to be the division of authority.

1. <u>The Division of Authority between the Union Government and the States in matters affecting agriculture</u>

Part XI of the Constitution is entitled "RElations between the Union and the States". It contains a number of important provisions aimed at clarifying the relations between the Union and the States. However, the most interesting and significant fact which emerges when one studies all the sections and the articles in this part is that ultimately all authority may be made to rest with the Union Government and theoretically at least the State may be deprived of all authority. First, there is a triple delineation of powers; one list including these which should be exercised exclusively by the Union Government, another including those to be exercised exclusively by the State Governments and third containing those on which both the State and the Union may legislate. The statement that all governmental power ultimately rests with the Union Government is based on this reasoning :

a. Article 248 provides that "Parliament has exclusive power to make any law with respect to any matter not enumerated in the concurrent list or State List". This settles the question of the so called police power. It is vested in the Union Government just opposite to the situation in America where the Police power resides with the States.

b. With respect to items in the concurrent list article 251 provides that "But if any provision of a law made by the legislature of a State is repugnant to any provision of a law made by Parliament, which Parliament has under either of the said articles power to make the law made by Parliament whether passed before or after the law made by the legislature of the State shall prevail". Therefore all matters in the concurrent list could fall under the jurisdiction of the Union Government.

c. Article 249 provides that "With respect to items in the State list the Union Government may take over legislative authority if the Council of States declares by resolution supported by not less than two-thirds of the members present in the building that it is necessary or expedient in the national interest that parliament should make laws with respect to matters enumerated in the State list". It is true that there are limitations on the length of time during which a law passed under this resolution will remain in effect, but nevertheless machinery does exist in the constitution for a delegation or transfer of all authority to the Union Government. Since all three of the lists in Schedule 7 contain many provisions of direct interest to agriculture and since many matters affecting agriculture will always be included in what we call the residuary powers these provisions in Part II of the constitution will have a profound effect on the solution of some of agriculture's problems. Certainly one must admit a ready means is provided for handling problems which become more than local in scope. A provision of article XI which might have great practical value is one which makes it possible for two or more States by resolution of their legislatures to request the Union Government to adopt an act regulating matters which the States feel can be best regulated by the Indian Government. For example if two adjoining States wish to control a contageous animal disease they might by resolution ask Parliament to adopt a law which will then be binding on the two States. Otherwise they would be confronted with all the problems which arise when the laws of the adjoining States are different and when an attempt is made to impose quarantine or the restrictions at the State line.

2. <u>The Right to own Property and engage in Farming</u>

Among the fundamental rights guaranteed by the Indian Constitution are certain rights to freedom as delinieted in article 19, included is the right of any citizen "To acquire, hold and dispose of property and to practise any profession or to carry on any occupation trade or business". I suppose in a country like India no one would seriously question the right of 80 per cent of the population to continue the only profession they have ever known, namely agriculture. However, it is worthy of note that the constitution has guaranteed the right to hold property and engage in any profession. Immediately of course one

briefly stated. For example during World War II with its limited agricultural resources and a limited number of people managing them, Great Britain adopted a law which provided in effect for an appraisal of those who were operating land to determine if they were meeting standards necessary to help achieve the production needed by the country in war time. This imposed a rather new test on one's legal right to engage in a business; namely whether or not he was not efficient enough. I doubt if this provision would be held constitutional in America. However, it served a very practical and seems to have been exercised in Great Britain without too much objection. Could the Government of India or an Indian State institute similar provisions? Probably so, with respect to legality, but there would be serious economic and social implications. Since the Indian constitution recognised and provides for economic and social planning a broad range of authority is no doubt possible without searching for constitutional "Pegs", as is necessary in America when the Federal Government wishes to adopt legislation largely social or economic in nature.

3. Land tenure and the right of Government to regulate holding and use of agricultural land and property for the common good

Part IV of the constitution is entitled "Directive principles of State Policy". Article 39 provides that (a) "The State shall in particular direct its policy towards securing (b) that the ownership and control of the material resources of the community are so distributed as to best subserve the common good; (c) that the operation of the economic system does not result in the concentration of wealth and means of production to the common detriment". Article 40 provides that "The State shall take steps to organise village panchayats and endow them with such powers and authority as may be necessary to enable them to function as units of self-government". Article 43 provides that "The State shall endeavour to secure by suitable legislation or economic organization or in any other way to all workers agricultural, industrial or otherwise, work, a living wage, conditions of work ensuring a

decent standard of life and full enjoyment of leisure and social and cultural opportunities and in particular, the State shall endeavour to promote cottage industries on an individual or cooperative basis in rural areas". Article 48 provides that "the State shall endeavour to organise agricultural and animal husbandry on modern and scientific lines and shall, in particular take steps for preserving and improving the breeds, and prohibiting the slaughter of cows and calves and other milk and draft cattle". These are admittedly broad statements of principle. However, they are integral parts of the constitution and must be taken into account in determing whether or not the State or the Union Government has authority to adopt particular legislation. Just as the general welfare clause in the American Constitution has been used to enlarge by implication authority specifically given so these general provisions in part IV of the Indian Constitution may be used to enlarge the specific authority contained in the Union, State and concurrent lists of schedule 7; as well as of other provisions contained throughout the constitution. It is clear, however, that in dividing authority and setting up provisions in the three schedules it was meant that the Indian States should be primarily concerned with agricultural land and its use and regulations. For example, paragraph 18 of the State list provides that "Land, that is to say, rights in or over land, land tenures including the relation of landlord and tenent, and the collection of rents; transfer and alienation of agricultural lands; land Improvement and agricultural loans, colonization" shall be a subject for State legislation and control. This intent is made quite clear by paragraph 6 and 7 of the Concurrent list which provide that "Transfer of property <u>other than agricultural land</u>; registration of Deeds and Documents; Contracts, including partnership, agency, contracts of carriage, and other special forms of contracts, <u>but not including contracts relating to agricultural land</u>" shall be subject to legislation by both the Union Government and the States. However, paragraph 41 of the concurrent lists provides that the custody, management and the disposal of property including agricultural land declared by law to be evacuee property is

in the legislative domain of both the Union and the State Governments. If we couple paragraph 18 of the State list which provides that the State has the authorityto determine rights in or over land, land tenures, including the relation of landlord and tenent and the collection of rents, transfer or alienation of agricultural land, land improvement and agricultural loans, with the provision in Article 39(b) of Part IV which states that "The State shall direct its policy towards securing that the ownership and control of the material resources of a community are so distributed as best to subserve the common good", it would seem that a large measure of authority has been given to the State. Legislation providing for limitation of holdings and for the reduction in size of large estates would seem to be perfectly in order under these provisions. Among the things which one might conclude the State could do as a result of these provisions are limit size of holdings and limit the use of particular land for particular purposes - for example if the State should determine that a particular crop is harmful and promotes soil erosion it might prohibit the planting of such a crop on certain kinds of land. This reminds one of the so called "land use regulation" provisions in state soil conservation district laws in America. The important difference is that the Indian constitution has made it possible for the State to engage in this kind of legislation whereas constitutional theory at home (U.S.A.) would only permit the imposition of land use regulations on agricultural land as a voluntary act on the part of the members of a soil conservation district and then only through publications of an ordinance, a referendum on the ordinance and a favourable vote by more than a majority of the land owners in a district. The most interesting thing is that in both countries the need for a regulation of agricultural land to conserve it as a national resource has been recognised. America is simply not prepared to go as far as India has gone in giving the State the right to exercise this control.

Indian States like the American States have the legislative authority to determine how land shall descend and how it may be alienated or passed on from one generation to the next. In America, however, as a result of common law doctrine and interpretation, the States are limited with respect to their ability to prevent fragmentation or to make any far reaching change in their laws of descent. The Indian States are not so limited. The handling of tax delinquent lands for example - always a plaguing problem in American States - should be subject to much more expeditious handling under Indian law.

4. The Right of the public to take farm land from the owner

American farm land owners may be described as always being on their guard against laws which permit the Federal Government, the States, municipalities and other public bodies to acquire rights in their land for a public purpose. I have an idea that Indian farm land owners are no different. It would appear, however, from the provisions in the Indian constitution that the Indian farmer is in a somewhat less protected position in this respect. The main difference in the laws of the two countries has to do with the language providing for compensation. Both federal and State laws in America provide that private property cannot be taken for a public purpose except for a just compensation. This gives the owner the privilege of making the public agency desiring his land initiate a law suit, having a jury impaneled and of giving evidence as to the value of his land. In the end the jury determines what the value shall be. Article 31 of the Indian Constitution provides that "No property shall be compulsorily acquired or requisitioned save for a public purpose and save by authority of a law which provides for compensation for the property so acquired or requisitioned and either fixes the amount of compensation or specifies the principles on which, and the manner in which, the compensation is to be determined and given; and no such law shall be called in question in any court on the ground that the compensation provided

by that law is not adequate". This law apparently precludes the individual property owner from introducing any evidence as to value, and makes it mandatory that he accept the compensation which may be fixed by law if the law fixes compensation, or determined under the principles which say have been established by the law in lieu of fixing compensation. I am sure that American property owners would not be ready to accept this method of determining the compensation for land; the lawyers of America would argue that this is in effect giving the public the right to take private property without compensating the owner for its true value. However, the Indian law seems to accord with the idea of social and economic planning contained in Part IVof the Constitution. Certainly where holdings are so small, if the public need required a large acreage of agricultural land and hundreds of villagers could come in contesting the right of the Government to take it and the value to be placed on it interminable litigation could very easily ensure, costing more perhaps than the total value of the land. In actual operation Indian law may net as much to the property owner as American law under which he could conceivably spend large sums to get the amount which he felt the property was worth. It is an interesting legal question and one very important to agriculture. However, its ramifications naturally extend much beyond the field of agriculture coming to the ultimate question of just what residue of rights in property are left with the individual. A favourite way of defining property rights is as a bundle which may vary in size depending on many things - the location of property for example and the liklihood of a public need for it. One's title may read the same in a city property as in a tract of farm land located where the population is sparse, when as a matter of fact his rights will be much greater in the latter.

5.

5. The authority to tax agricultural lands and agricultural income.

An interesting feature of Indian constitutional law is the separation of authority to tax agricultural lands and income from authority to tax other kinds of property and other incomes. Article 269 gives the Government of India authority to levy succession and estate duties and other taxes on property other than agricultural land.

This separation will certainly give rise to the need for definitions: What is "agricultural land" and what is "agricultural income". For example American judges and law makers have been plagued by these questions and it is reasonable to suppose that Indian judges, lawyers and law-makers will be plagued in the same way as time goes on. Article 270 provides that "Taxes on income other than agricultural income shall be levied and collected by the Government of India". The Union list in schedule 7 specifically excludes taxes, estate duties and duties in respect of a succession on agricultural lands. The complementary provisions giving the State authority are contained in sections 45, 46, and 47 of the State list in schedule 7. These sections give the individual states authority over land revenue, including the assessment and collection of revenue, the maintenance of land records, survey for revenue purposes and records of rights, and alienation of revenues; taxes on agricultural income, duties in respect of succession to agricultural land and estate duty in respect of agricultural land. Under American constitutional provisions land and real estate are taxed by the State and all incomes are taxed by the Federal Government, though the State may by constitutional provision also tax incomes. Constitutional draftsmen gave some thought to the meaning of "agricultural income" by providing that this term as defined for the purpose of the enactments relating to Indian income tax could not be changed through legislation in either House of Parliament except on the recommendation of the president. Apparently the present meaning of agricultural

relating to Indian income tax," despite the provision about the definition being changed only after recommendation by the president. At least this seems to be the meaning of section 366 when it states that "In this constitution unless the context otherwise requires" "agricultural income" means agricultural income as defined for the purposes of the enactments relating to Indian income tax". It is the opinion of the writer that the constitution is left in rather a confused state with respect to what agricultural income may be made to mean.

6. The movement of agricultural goods between the States.

Probably no provision in the American constitution has received more attention than the so-called Inter-State commerce clause. The Indian constitution recognizes the importance of provisions on this subject by devoting a whole part of the constitution to it. Part XIII consisting of Articles 301 to 307 is entitled "Trade, Commerce and Intercourse within the Territory of India". The first two articles are particularly important. Article 301 provides that subject to other provisions of this part, trade, commerce and intercourse throughout the territory of India shall be free. Article 302 provides that Parliament may by law impose such restriction on the freedom of trade, commerce or intercourse between one State and another or within any part of the territory of India as may be required in the public interest. Here then we have the public interest established as the test to determine when the Union Government may exercise its authority. Though it is announced as a matter of policy that trade, commerce and intercourse throughout India shall be free, Article 304 nevertheless gives the legislature of a State the right to impose on goods imported from other States or from Union territories any tax to which similar goods manufactured or produced in that State would be subject, also the State is given authority to impose such reasonable restriction on the freedom of trade, commerce or intercourse with or within that State

as may be required in the public interest. Certainly construing these two provisions together one finds no gap. As a matter of fact there may be some overlapping except for the fact that if parliament chooses to legislate then presumably any State laws or regulations would become ineffective. Turning to the Union list in the 7th schedule we find that section 42 gives the Union parliament the right to legislate regarding inter-state trade or commerce. There are two other sections of interest in the Union list; Section 51 provides that parliament may establish standards of quality for goods to be exported out of India or transported from one State to another. Section 52 provides that it may control industries, the control of which by the Union is declared by parliament by law to be expedient in the public interest. For example, if parliament were to decide that the control of milk marketing is necessary to protect the public interest then the dairy industry in India could be legally subjected to control by the Union parliament. It would appear too that in establishing standards of quality for goods to be transported from one State to another the Union Government might be able to extend its authority considerably. An interesting question might arise in cases where the States have themselves established standards of quality and the Union Government establishes a different standard of quality so that products entering a State might not meet the standard of that State but might meet the standard imposed by the Union Government. The question would then arise as to whether or not the State could keep the goods from coming within its boundaries.

This affords a good example of the difference in approach under Indian and American constitutional law. Instead of the courts deciding whether or not a particular industry so affects interstate commerce as to give the federal government authority, as would be done in America, parliament in India can decide whether or not it is expedient for the Union to control an industry in the public interest.

American judges talk a great deal about the principle that it is the prerogative of the legislature to decide whether or not a thing is good policy, and that the court is confined only to limited constitutional or legal questions. However, the courts go ahead and decide constitutional questions on the only basis they can - namely the economic and social. Certainly there is a realism in the provisions of the Indian constitution.

The provisions in sections 26 and 27 of the State List in Schedule 7 afford grounds for confusion. These sections give the State authority over trade and commerce within the State, and the production, supply and distribution of goods, subject to the provisions of entry 33 of the concurrent list. Entry 33 in the concurrent list gives both to the State and the Union Government the right to legislate regarding trade and commerce and the production, supply and distribution of :

(a) the products of any industry where the control of such industry by the Union is declared by Parliament by law to be expedient in the public interest, and imported goods of the same kind as such products;

(b) Food stuffs including edible seeds and oils;

(c) Cattle fodder including oil cakes and other concentrates;

(d) Raw cotton, whether ginned or unginned, and cotton seed; and

(e) Raw jute.

Apparently section 33 simply attempts to single out certain items of commerce on which the Union government should be given power to legislate concurrently, even though such items are wholey a matter of trade and commerce within the State as meant by section 26 of the second list of schedule 7. One wonders just how necessary this provision is, or how clear the situation will be in view of section 52 of the Union list of schedule 7 which provides that parliament may by law control industries when it is felt to be essential in the public interest. One may ask why particular items were singled out in section 33 of the concurrent list and who will ultimately decide what constitutes

"trade and commerce within the State" as distinguished from trade and commerce between the States. American judges have developed the concept of the thing "affecting interstate commerce" even though the thing i self may not move outside the State. Will the same concept grow up in Indian constitutional theory. My guess would be that it will.

Neither parliament nor the state legislatures are permitted by the constitution to make laws which discriminate between one State and another. However in case of emergency arising from the scarcity of goods in any part of the territory in India parliament is given authority to make discriminatory laws in so far as necessary. It is difficult to see how confusion is to be prevented when vested interests come in conflict, and when these various provisions on interstate movement of agricultural goods must be construed together. Even definitions will be difficult. For example, in interpreting entry 33 of the concurrent list, what is the definition of "food stuffs", what is the definition of "cattle fodder"?

7. Control of animal and plant diseases

This is an area in which both the Union Government and the States are concerned. Section 29 of the concurrent list provides that both the States and the Union Government may legislate for the prevention of the extension from one State to another of infectious or contageious diseases or pests affecting men, animals or plants. This would seem to be a rather workable provision in as much as any legislation of the Union Government which runs counter to that of a State would supersede the State's legislation. This would permit the Union Government to control the spread of disease from one State to another but would still permit the State to adopt the needed letislation and regulations for control of the disease within the State or even for control of diseases entering from outside the State in so far as it did not conflict with the Union legislation or regulations. It would be presumed I suppose that the provisions in sections 14 and 15 of the State list in schedule 7 which gives the state the authority to legislate regarding "agriculture including agricultural education, and research, protection against pests and

prevention of plant diseases, preservation, protection and improvement of stock and prevention of animal diseases" are to be construed with section 29 of the concurrent list as giving the State authority only in so far as it does not run counter to union legislation. However, it might be argued there is some overlapping in these provisions. Also the States apparently don't have the right to quarantine, since section 81 of the Union list gives the Union Government the right to control interstate migration and interstate quarantine. Perhaps it can be argued that quarantine as thus used refers only to people since interstate migration is a part of the same sentence. However, it is not clear. The desirable situation of course with respect to the prevention of the spread of animal and plant diseases or pests from State to State is to have good Union legislation which operates uniformally throughout all the States. This would preclude a State from adopting legislation ostensibly for the purpose of preventing the importation of pests or diseases, when as a matter of fact the legislation is meant only to protect its own markets and thus hamper interstate trade and communications.

8. Agricultural Education and Research

The constitution obviously intended to give to the States the right to develop and control agricultural educational research. Section 11 of the State list provides that the State may legislate concerning education, including Universities, subject to certain provisions in the Union list and the concurrent list. Section 14 gives the State authority to legislate regarding agriculture, including agricultural education and research. Union agencies and institutions of course are exempted and are subject to Union control. Perhaps the most important reservation of authority in the Union Government is the provision in section 66 of the Union Schedule which gives parliament authority to coordinate and determine standards in institutions for higher education or research and scientific and technical institutions. This might become a very important provision if an effort is made to do away either wholely or in part with the external examination system. That system is now

mainly a method of accrediting institutions by examining individuals. If an attempt is made to get away from this system so that instructors will have greater freedom and better teaching may result some other means of evaluating institutions will have to be found. Section 66 provides one very direct answer, namely that the Union Government may determine standards in institutions of higher education. Perhaps the same section could also be used to justify a large measure of control in return for federal grants, though technically interpreted it would seem to apply only to standards and not to organisation, philosophy or lines of work which might be followed.

9. Excise duties on agricultural products

An examination of section 84 of the Union list and section 51 of the State list would lead me to believe that the "State" may levy duties of excise on only alcoholic liquers for human consumption and opium, Indian hemp and other narcotic drugs and narcotics. The Union Government has been given the right to levy excise duties on all other goods manufactured or produced in India. However, the State list in section 52, 53 and 58 gives the State the right to levy taxes on animal and beasts, on the consumption or sale of electricity and on the entry of goods into a local area for consumption use or sale therein. Section 54 of the State list gives the State the authority to tax the sale or purchase of goods other than newspapers subject to the provisions of Section 92a of the Union list; Section 92A gives the Union Government authority to tax the sale or purchase of goods other than newspapers where such sale or purchase takes place in the course of interstate trade or commerce. These are interesting provisions. The most extraordinary thing they do is exclude either the Union or State Government from taxing the purchase or sale of the newspapers. Beyond that they make the taxing authority depend on whether or not "sale or purchase takes place in the course of interstate trade or commerce".

Here again we have one of these wide open questions in the field of constitutional law. When does the sale or purchase takes place in the course of interstate trade or commerce and who is the final authority to determine if it does? Can the legislature be asked to decide on the myriad of questions which could conceivably arise on this score; shall an administrative agency be set up to make determinations or shall the courts be called upon to interpret the law. It will be interesting to see how this is ultimately solved.

10. Encouragement and control of animal husbandry

Article 48 of the constitution provides that "The State shall endeavour to organize agriculture and animal husbandry on modern and scientific lines and shall in particular take steps for preserving and improving the breeds and prohibiting the slaughter of cows and calves and other milk and draft cattle". As used in this Article, "State" refers to both the Union Government and the Indian States. This is listed as a directive principle of State policy. The more specific provisions in the State list schedule 7 provide that the State shall legislate for the preservation, protection and improvement of stock and the prevention of animal diseases, veternary training and practice and that it shall legislate regarding pounds and the prevention of cattle trespass. However, legislation on the prevention of cruelty to animals is made the prerogative of both the Union and State Governments by section 17 of the concurrent list. Actually it would seem that something would have been gained if all these provisions could have been placed in the concurrent list since the Union Government is also concerned with the preservation, protection and improvement of stock and prevention of animal disease and also with veterinary training and practice. As a matter of fact the prevention of cattle trespass may get to be a national objective but as it is now stated it is subject wholey to State legislation. Here again the question of just how much authority is created by the part entitled "directive principles of state

policy", is raised; this time mainly with respect to the authority which might be created in the Union Government.

11. The encouragement of local Government

One difference in rural organisation in America and India exists in the large number of public corporations which the farmers of America have formed to accomplish various objectives and in the small number of such bodies in India. By voluntary action under the law and by voting taxes on themselves farmers in America may set up school districts, public libraries, fire protection districts, wild life protection districts, erosion control district and a large number of public bodies to accomplish particular objectives. It is interesting to note that the Indian constitution has created the same possibility in Indian States by providing in section 5 of the State list that "the State may legislate regarding local Government, that is to say the constitution and powers of Municipal Corporations, Improvement Trusts, District Boards, Mining Settlement authorities and other local authorities for the purpose of local self government or village administration". This clearly indicates an interest on the part of the farmers of the constitution in encouraging local governmental bodies in the solution of the many rural problems existing in India. However, very little of this kind of legislation has been adopted and so far as the writer can tell from a very limited review of some legislation of this kind - the soil conservation Act of Uttar Pradesh for example - the legislation is more directive than permissive and attempts to set up an organization rather than providing the machinery under which farmers can set up and themselves operate an organization. This is perhaps inevitable and may characterise this kind of local enabling legislation for a long time to come. Much thought and energy has been devoted of course to improving and strengthening the panchayat organization in Indian villages, and the National Extension Service can help a great deal in instilling a spirit of progress and independence in these bodies by relying on them in the implementation of its program.

12. Water Control

This is a subject of great importance in India and one on which it would be expected both the Union Government and States would have authority under the constitution. Such we find is the case. Entry 56 in the Union list gives parliament the right to "regulate and develop interstate rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by parliament by law to be expedient in the public interest". Entry 17 in the State list gives the state legislatures the right to legislate concerning "water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of entry 56 in the Union list". Basic laws and regulations under which the land is irrigated and drained would then be a subject of State legislation. Likewise the development of water power within the State the supplying of water supplies to municipalities or other bodies and the storage of water and construction of canals for carrying water would all be a subject on which the State legislature has authority. Even interstate rivers and river valleys would be subject to control by the States themselves in so far as there is no declaration by parliament that the regulation and development of interstate rivers and river valleys is expedient in the public interest. Here again it would seem we have a subject on which there should be some provision in the concurrent list since both the Union Government and State Governments are vitally concerned. However, there are no provisions in the concurrent list.

13. Forests, Fisheries and wild life

Legislative control of forests, fisheries and the protection of wild animals and birds rests with the States under entries 19, 20 and 21 of the State list. However, entry 57 in the Union list vests in parliament the right to legislate concerning fisheries and fishing beyond territorial waters. However, one would assume that if parliament

determined it to be in the expedient public interest to control fishing on major streams where more than one State might be involved then under entry 52 of the Union list it could control industrial fishing in such waters. An interesting feature of State administrative organization for animal husbandry and agriculture is the fact that such departments of animal husbandry normally include the development of fisheries as a part of their function. In the American States fisheries have never been subject to control by departments of agriculture, but have belonged to some other department of State Government.

14. The relief of agricultural indebtedness

The relief of agricultural indebtedness is stated to be a function of the Indian States in entry 30 of the State list. However, legislative control of bankruptcy and insolvency is included in the concurrent list in entry 9. Construing these provisions together one would conclude that positive programs for the relief of agricultural indebtedness would stem from the States. Under American constitutional law bankruptcy is a function of the federal government and it has been assumed that the relief of agricultural indebtedness by way of moratorium or other devices for altering contractual provisions between the agricultural debtor and his creditor are solely within the federal domain. It would seem that important questions may arise under the Indian constitution in trying to determine where the relief of agricultural indebtedness as providing by the States leaves off, and where provisions of bankruptcy and insolvency in the concurrent list takes up. Since it is in the concurrent list however, it would be presumed that the States could go all the way with the program for the relief of agricultural indebtedness including special provisions on farm bankruptcy and only in case of conflicting legislation by parliament would any of its provisions fail. It may be that it would have been better to have placed the relief of agricultural indebtedness also in the concurrent list so that both governments would coordinate any programs felt essential. However, it may have been placed in the State list to impose a more positive duty on the part of

15. Markets and Fairs

As one would suspect this is a subject for State legislation as provided in entry 28 of the State list. Construed with other powers given the States in the State lists, namely to preserve, protect and improve stock, prevent animal disease and control weights and measures, this would give the States needed authority to regulate markets and fairs to the extent felt necessary to prevent injury to the public. Quite a common provision in the legislation of American States is what is known as community sales laws. These are specifically aimed at livestock sales or auctions and require that sales be conducted under the supervision of licensed veterinarians, and that only animals which are free from disease be sold from the sales premises. It will be a long time no doubt before the Indian States can impose any such laws or regulations on markets in India but the authority has been given by the constitution and will be there when needed.

16. Agricultural Cooperatives

Entry 43 in the Union list gives parliament authority over incorporation, regulation and winding up of trading corporations including banking, insurance and financial corporations but not including cooperative societies. Entry 32 of the State list gives the State legislature authority over the incorporation, regulation and winding up of corporations other than universities and those specified in the Union list. The State may legislate regarding unincorporated trading, literary, scientific, religious and other societies and associations and cooperative societies. Thus incorporation and legislative control of agricultural cooperative societies is a function of the State legislature. This is likewise true in the American States except that by federal law agricultural cooperatives have certain privileges which other cooperatives or corporations don't have. There is no parallel provision in the Union list of the 7th schedule of the Indian constitution. Entry 85 in the Union list which gives parliament the right to levy corporation taxes would presumably include cooperative corporations as

as other corporations since there is no exclusion listed in this entry. However, entry 82 gives parliament the right to levy taxes on income other than agricultural income. The question then might be raised as to whether income from an agricultural co-operative is agricultural income or corporate income. There may be rather clearly defined principles of taxation as between the States and the Union Government which don't appear in the constitution itself and with which the writer is unfamiliar. Therefore, this subject not be pursued any further. However, it is evident that some confusion may arise unless there are such fairly clear cut regulations or procedures or principles.

17. The adulteration of food stuffs and other goods

This subject is covered by entry 18 of the concurrent list. Thus both the Union parliament and the State legislatures have authority to control adulteration. This is certainly sensible since adulteration is both an intrastate and interstate matter. Under this provision the States and the Union Government may collaborate in the establishment of rules and regulations which will iron out any gaps in control. However, it will probably be a long time before either Government can adopt and enforce any comprehensive legislation on this subject. Development is likely to come first through laws and regulations of the Union Government to encourage the export of agricultural food stuffs when a surplus in India arises.

18. Price Control and economic planning for agriculture

There are a number of entries in the concurrent list which quite clearly place the responsibility for price control and economic and social planning on both the Union and State Governments. Entries of direct importance are 20, 21, 22, 23, 24, 25, 27, and 34. These cover the subjects of economic and social planning, commercial and industrial monopolies, combines and trusts, Trade Unions, Industrial and Labour Disputes, Social Security and Social Insurance, Employment and unemployment welfare of labour including conditions of work, Provident funds, Employers Liability, Workmen's Compensation, Invalidity and Old age pensions and

maternity benefits, vocational and technical training of labour, relief and rehabilitation of persons displaced from their original place of residence by reason of the setting up of the dominions of India and Pakistan and price control. Whether or not the States should have authority over price control is a debatable question. American States have such authority so long as it is not used to affect interstate commerce, but the results have not been wholey satisfactory. In part at least it has resulted in another means for creating trade barriers and unless strong and positive federal legislation comes along and irons out the discrepancies unequal conditions are created for agricultural producers in adjoining States. It might have been better if India had started with the notion that all price control would emanate from the Union Government. Price control of an agricultural product any where is bound to influence the price and distribution - even the production of that product elsewhere. It is a subject, therefore, in which the Union Government will always be interested even though the State may do the legislating. Likewise with respect to social security and social insurance, if the States all adopt laws which differ then it would seem that advantages or disadvantages to the agricultural population would be created depending on location. These advantages or disadvantages if marked enough might conceivably cause shifts in population and in the production of the populations thus shifted. Here again it is a subject in which the Union Government is vitally interested and over which it might be argued more control should have been reserved.

S U M M A R Y

By way of comparison with the constitution of the United States and also by way of prediction as to some of the problems which may arise the following conclusions occur to the writer:

1. There are two striking differences between the two constitutions which appear without a deep study of either. One is the fact that the American constitution says nothing about agriculture. There is not a single provision in the constitution of the United States which mentions the word "agriculture", "farmer" or "animal or animal husbandry" or anything directly connected with agriculture. On the other hand the Indian constitution contains many provisions throughout dealing with the agriculture, animal husbandry and the problems of rural people. The second striking difference of course is in length. This accounts in part at least for the difference in agricultural provisions. The constitution of the United States is short and is aimed at broad principles whereas the Indian constitution besides stating broad principles goes into detail in the hope that answers will be provided for problems which will arise in the future.

2. It is almost certain that the very details which are included in the Indian constitution on agriculture (with the logical purpose of settling certain knotty question before hand) will eventually lead to more controversy than would existed if general principles had been stated.

3. Through more than a century and a half of interpretation by the courts the constitution of the United States has evolved as an important social document. The drafters of the Indian Constitution have in effect written such an evolution into the constitution and have made it a social document from the outset. As fair a guess at any is that given a favourable economic and social environment over the next century, both constitutions will support quite similar political and legislatic doctrine.

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For Participants Only

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SEMINAR

ON

AGRICULTURAL ADMINISTRATION

(March 9-12, 1966)

THE PROGRESS OF AGRICULTURE IN TAIWAN SINCE 1947

By:

Yien-si Tsiang
Commissioner
Joint Commission on Rural Reconstruction
Republic of China, Taipei, Taiwan.

INDIAN SCHOOL OF PUBLIC ADMINISTRATION
INDRAPRASTHA ESTATE
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THE PROGRESS OF AGRICULTURE IN TAIWAN SINCE 1947

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THE PROGRESS OF AGRICULTURE IN TAIWAN SINCE 1947

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By Y. S. Tsiang
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Taipei, Taiwan, Republic of China
February 1966

The Republic of China has made great advances in agriculture in the island province of Taiwan since its retrocession to Chinese sovereignty at the end of World War II after half a century of Japanese rule from 1895 to 1945.

When the Chinese Government first took over the administration of Taiwan in the immediate postwar years, the most pressing problem it faced was that of rehabilitation and reconstruction. To repair the damage and make good the deterioration suffered during the war, Chinese administrators, engineers and agriculturalists undertook to restore the power plants, the fertilizer plants, the sugar mills and other agricultural processing factories, and also to promote use of improved seeds, organic manures, chemical fertilizers, pesticides, etc. Irrigation canals and flood control installations were also gradually repaired. These efforts soon paid off and agricultural production began to thrive. By 1952 the pre-war peak of agricultural production set in 1939 was reached. From then on, steady progress has been maintained.

I. MAJOR POLICIES AND PROGRAMMES

The major policies and programmes of the last two decades dealt with under this heading include (1) land reform, (2) agricultural extension, (3) agricultural credit, (4) seed improvement, (5) agricultural marketing, (6) research and education, and (7) farm implements and mechanization.

By implementing three successive Four-Year Economic Development Plans, beginning from 1953, the Chinese Government succeeded in increasing agricultural production in Taiwan more than 50 per cent above the pre-war level and boosting industrial production threefold. In the rate of over-all economic growth since the War, Taiwan has the distinction of ranking third in the world, next only to Japan and West Germany.

When the Chinese Government set about the task of agricultural development on Taiwan, it soon found that before this could be done the traditional system of land tenure must be reformed. For this purpose, a three-phase programme consisting of farm rent reduction, sale of public lands, and conferring landownership on the tiller was implemented.

Land Reform

Farm rent reduction was carried out in 1949. It called for the general reduction of all farm rentals from an average of 50 per cent to a maximum of 37.5 per cent of the annual main crop yield. Some 260,000 hectares of lands leased to tenants were affected by the programme and about 300,000 tenant families were benefited by it.

The reduction of farm rentals freed the tenant farmer from heavy burdens and gave him a chance to save money and buy land. With the money thus saved, he could build his own house, buy new furniture, marry, and plan for the future. The landlord could no longer terminate the tenancy at will because written contracts now replaced verbal ones. The tenant was also freed from illegal burdens and impositions that had been imposed on him in the past. All this provided him with the incentive to make new improvements on

the land since he knew that he would be the one to benefit.

The second phase of the land reform programme carried out in Taiwan was the sale of public lands. Form 1951 to 1958 five successive sales of such lands were conducted and 70,000 hectares or 70 per cent of all the public lands on lease to tenants were sold to 140,000 farm families. First priority in purchase was given to farmers who were then the actual tillers of the lands. The farmer-purchasers constituted 18 per cent of the total farm families in Taiwan at the time. The land value was fixed at two and a half times the total annual main crop yield and was to be paid in 20 semi-annual installments spread over a period of ten years. This easy method of payment enabled the tenant purchaser to assume a financial burden which was just the equivalent of the annual rent he would have to pay in his capacity as a lessee of the same piece of land he now purchased. Both this method of payment and the sale of public land to its incumbent tiller set the pattern for the third phase of the land reform programme.

The third and last phase of the land reform measures was the so-called Land-to-the-Tiller Programme which was carried out in 1953. Under this programme the landlord was required to sell all of his tenanted land in excess of three

hectares of medium-grade paddy land or six hectares of medium-grade dry land to the government at a price two and a half times the amount of the annual main crop yield, to be resold by the government to the incumbent tiller at the same price. The landlord received from the government as compensation for his land 70 per cent of the payment in land bonds redeemable in kind and 30 per cent in government enterprise stock shares. The land bonds bore an annual interest of four per cent and were redeemable in 20 semi-annual installments over a ten-year period. Paddy land bonds were redeemable in rice and dry land bonds in cash based upon the current market value of sweet potatoes at the time of redemption. By tying the value of the land bonds with the two staple food crops, the landlord was protected from possible inflation.

The farmer-purchaser paid to the government a price equivalent to two and a half times the value of the annual main crop yield plus a four per cent interest per annum. He would pay off the land price in 20 semi-annual installments spread over a period of ten years. The yearly payment made by the farmer-purchaser was about equal in amount to the annual farm rent he would have to pay if he had remained a tenant. He came into full possession of the land he had purchased from the government upon the payment of the first

installment of the purchase price. But he was not allowed to sell the land until the full value had been paid.

Altogether, 194,823 tenant families bought about 140,000 hectares of land from 106,409 landlords through the intermediacy of the government under the Land-to-the-Tiller Programme.

These land reform measures, as briefly described above, were carried out smoothly and peacefully. Being fair and just to every one concerned, they amounted to a bloodless social revolution. The landlord received equitable compensation for the land he sold to the tenant through the government. He might retain any amount of land if he cultivated it himself with the help of members of his own family. Before the reform 34 per cent of Taiwan's farmers were full landowners, 26 per cent owned part of the land they tilled, and 40 per cent were tenants. After the reform, full landowners constitute 64 per cent, those owning part of their land 22 per cent, and full tenants 14 per cent. The incentive of landownership has accounted for the farmers' unqualified efforts at improving his farm land and increasing his crop production in the last decade.

Agricultural Extension

The agricultural extension programme in Taiwan has been carried out by farmers' associations with technical and financial assistance by the government and the Joint Commission on Rural Reconstruction (JCRR). It includes three aspects, namely, farm extension, 4-H clubs, and home economics.

Initiated in three townships in 1955, farm extension education work is being carried out in 290 townships with

and 3,600 odd local volunteer leaders.

One of the most important activities of farm extension is the organization of farm discussion groups. A typical farm discussion group is composed of about a score of adult farmers. It generally meets once a month to study, discuss, and decide on farming activities and listen to talks given by township extension advisers. It is here that the members learn the fundamentals of democracy and parliamentary rule. Some discussion groups are general in nature and some have to do with certain farm products or activities such as "vegetable discussion groups", "rice discussion groups", "sweet potato discussion groups", and "hog-raising discussion groups".

The township extension advisers also organize and hold methods demonstrations and results demonstrations. As their names imply, these demonstrations show farmers the methods or techniques used in the farming of certain crops and the results to be obtained. There are likewise frequent farm tours and exhibitions.

4-H clubs for farm youths, the second aspect of agricultural extension in Taiwan, began in 1952 with the organization of clubs in seven vocational agricultural schools and in one township in each of four countries. The work spread rapidly. There are now more than 5,000 clubs in 285 townships in all the 22 cities and countries with a total membership of some 65,000 rural boys and girls. Almost one thousand 4-H clubs with over 15,000 members are carrying on 4-H activities in 65 secondary schools under the guidance of more than 800 volunteer leaders.

It is the aim of 4-H clubs to train their members in self-reliance, self-discipline, and habits of industry. By

the use of their heads, hearts, and hands and the development of their health, the boys and girls who join 4-H clubs dedicate themselves to clearer thinking, greater loyalty, greater service, and better living. They learn how to raise poultry, plant farm crops, and do other farming work. By taking part in 4-H club work, they also learn and practise the basic principles of democracy and good citizenship.

The third phase of agricultural extension is home economics for rural women. Started in 1956, the home economics extension programme has been gradually expanded to cover 196 townships on the plains and 40 townships in the aboriginal areas on Taiwan proper and nine townships on the offshore islands of Kinmen (Quemoy) and Matsu. There are altogether 267 home economics extension field workers at all levels.

The objectives of home economics extension are: (1) to help the rural people have better nutrition; (2) to help them improve their health and sanitation; (3) to help them earn more money or save money through home improvements; and (4) to develop rural leadership and good citizenship among the rural people.

As a result, the rural people now have better nutrition, enjoy a more comfortable and pleasant home life in a more sanitary environment, incur less household expenses, and are able to earn some extra income through rural sidelines.

As a former JCRR consultant on agricultural extension, Mr. Frank Colling has pointed out, the agricultural extension education programme in Taiwan is characterized by certain commendable features. To begin with, the high degree of local control makes it possible for extension programme to meet the needs and desires of the local people.

Secondly, the 4-H clubs, the farm discussion groups, and the home improvement clubs offer excellent opportunities for the development of leadership among the rural people. Thirdly, some well-qualified and dedicated people are employed to serve as professional educational workers. Fourthly, it is a good practice to start with simple and practical projects which are inexpensive, quickly recognized, and personally satisfying such as lighting, sanitation, and food projects in home economics. Owing to these and other characteristic features, the agricultural extension programme has been highly successful in the last ten years.

Agricultural Credit

In Taiwan there are five important agencies that provide agricultural credit. They are the Land Bank of Taiwan, the Taiwan Provincial Cooperative Bank, the Taiwan Sugar Corporation, the Taiwan Provincial Food Bureau, and JCRR. Before 1958 there was not much coordination among these institutions, thus leading to duplication of efforts and inefficiency. To correct this situation, JCRR launched a supervised agricultural credit programme in 1958. This programme, experimental in nature, aimed at improving the lending methods and practices, by combining farm technical advice and credit services, of the township farmers' associations through which most of the loans made by the lending agencies to farmers were channeled.

This supervised agricultural credit programme developed and merged into a bolder and more comprehensive unified agricultural credit programme in 1961 under which JCRR has provided permanent and dependable loan funds of NT$300,000,000.

Two-thirds of the funds are to be lent, free of interest, to participating farmers' associations which are obligated (1) to match not less than 70 per cent of their regular members' deposits for re-lending, with interest, to farmers for agricultural production purposes, (2) to build up a capital reserve to be further used as lending funds, and (3) to segregate their credit department accounts from those of the marketing and supply departments.

The remaining one-third of the funds are held in the custody of the Land Bank and the Cooperative Bank and are to be released, when necessary, at the regular interest rate to participating farmers' associations to supplement the latter's lending funds for agricultural production. In releasing these funds, (1) both the two banks have to contribute not less than 20% of the release, and, (2) the Land Bank is to finance loans for a term longer than twelve months and the Cooperative Bank those not exceeding twelve months.

An agricultural credit planning board was set up to administer the programme: to select participating farmers' associations and to delineate the activities of the lending institutions. A participating farmers' association has to have efficient credit staff, sound financial status, and to be willing to stick to the operating conditions as specified above. The board, convened by JCRR, consists of one representative each from the Ministry of Economic Affairs, the Ministry of Finance, the Central Bank of China, the Taiwan Provincial Department of Agriculture and Forestry, the Taiwan Provincial Department of Finance, the Council for International Economic Cooperation and Development, the Taiwan Provincial Farmers' Association and JCRR.

In the four years of operation, the programme

cent of the total number of township farmers' associations that have a credit department. Eight out of ten farm families in Taiwan, or some 650,000 families in total, now enjoy direct access to the compound services of extension and credit of their own farmers' associations. During the four-year period of operation, more than 208,000 farmers were benefited by the services of the programme.

The successful operation of the programme should be attributed mainly to the supervision of JCRR field inspectors and the cooperation and coordination among the agencies and organization concerned.

Seed Improvement

In the first few years after the retrocession of Taiwan to China, the Chinese Government merely re-established the Japanese system of a three-level rice seed multiplication (foundation seeds, stock seeds, and extension seeds) for the *japonica* varieties. From 1950 to 1955 efforts were made to improve the physical facilities of all three levels of seed farms, including seed drying grounds and different types of seed storage. In 1960 the Taiwan Provincial Department of Agriculture and Forestry introduced a system of seed multiplication and distribution with field inspection and laboratory tests of rice seeds. Now the seed multiplication and certification programme includes 13 kinds of cereal and fiber crops and four kinds of vegetables. More kinds of cereal and fiber crops and vegetables will be included in the programme as new and improved varieties are ready for commericial extension, and as technical problems of seed production, the selection of contract seed growers, and other problems relating to specific kinds of crops are solved.

In order to encourage seed production, stock seed growers are given the foundation seeds free of charge plus some cash subsidy. The seeds produced by the stock seed growers and duly certified are bought by the local prefectural government at a premium price favourable to the growers. Similarly, the extension seed growers are given stock seeds free of charge, but with no cash subsidy. The seeds produced by the extension seed growers and duly certified are surrendered to the local farmers' associations on a barter basis at a 15 per cent premium.

The actual distribution of certified seeds is done by and at the township farmers' association. The farmers may get the certified seeds by surrendering the same quantity of their own seeds to the farmers' assocation, but no farmer may get more than what he actually needs.

The development of modern seed technology may be dated from the First Far East Seed Improvement Workshop sponsored by the International Cooperation Agency (ICA) of the United States and held at Taipei in 1956. This workshop served to highlight the importance of quality seeds to the increase of agricultural production. It also showed that the availability of good seeds through a well-planned and executed programme of seed multiplication, certification, and distribution is indispensable to a modern agriculture. It called upon the participating countries to step up the training of seed inspectors, seed analysts, seed technologists and seed administrators, to set up seed testing laboratories, and to lay down minimum seed certification standards for various levels and kinds of seeds and other measures to safeguard the quality of seeds.

Following the 1956 Workshop two seed laboratories were established, the Seed Technology Research Laboratory at the National Taiwan University in 1957 and the Taiwan Provincial Seed Testing Laboratory by the Taiwan Provincial Department of Agriculture and Forestry in 1959. The functions of the former one are to undertake basic research in seed physiology, morphology, and taxonomy, to serve as a training site for local seed technicians and to provide the students of the university with the necessary laboratory facilities for practices on agronomic courses. As to the latter, it is well-equipped with all the necessary instruments for determining the seed moisture content, making seed purity analysis, and determining seed germinability.

In 1960 an International Seed Exchange Center was established at the Taiwan Agricultural Research Institute. Its functions are to centralize and simplify the introduction of germplasm of various kinds of crops from foreign sources to the various agricultural institutions so as to avoid duplication, to represent Taiwan in the international exchange of seed stocks with foreign countries, to keep complete records of the introduced and exported seed stocks, and to handle the follow-up work on the seed stocks introduced for trial planting and other purposes.

Agricultural Marketing

The aim of governmental policy on agricultural marketing in Taiwan is to keep agricultural prices relatively stable and make farm products available to most people. The Taiwan Provincial Food Bureau is the agency responsible for collection of part of the rice production, for rationing to the armed forces and their dependents,

for the stabilization of rice prices, and for the export of rice. The Taiwan Sugar Corporation, a government enterprise, contracts with farmers for cane production, handles most of the processing and export of white sugar. The Taiwan Provincial Tobacco and Wine Monopoly Bureau, as its name shows, is a government monopoly. It issues licenses to farmers for tobacco growing, purchases and manufactures tobacco leaves.

The Taiwan Provincial Department of Agriculture and Forestry is the agency responsible for directing and supervising the marketing of all agricultural products except rice, sugar, tobacco and wine. It also gathers and publishes statistics on the prices and marketing of farm products.

The Taiwan Provincial Bureau of Inspection and Quarantine is authorized with the functions of inspection and quarantine of all agricultural products for exportation, for each of which detailed standards for grading, packing, and labeling have been prescribed.

Two groups of organizations are engaged in the marketing of farm products in Taiwan. They are the farmers' associations and the fruit marketing cooperatives.

The 342 township farmers' associations in Taiwan are equipped with 1,145 rice warehouses which can store approximately 420,000 metric tons of paddy rice; 762 storages for other farm products; and 422 rice mills with a daily milling capacity of 8,000 metric tons of rice. Besides the warehouses and rice mills, most farmers' associations are also equipped with other marketing and processing facilities such as vegetable and livestock markets, feed mahufacturing plants,

Some associations also have peanut hulling machines, starch making machines, and tea processing machines. They act as agents of government rice and jute collection programme, provide their members with marketing and processing services, and are designated as the sole supplier of onions for export.

There are altogether seven fruit and vegetable marketing cooperatives. They are designated as sole agents for assembling, grading, packing, and internal transportation of the bananas and citrus fruits for export. The most important item of fruits exported from Taiwan is bananas.

Before the improvement of the banana marketing system in April 1963, the banana grower could get only less than one half of the prices of export sales and they had no particular interest in growing this crop. This was a serious obstacle to production increase and quality improvement of Taiwan bananas. To correct this situation, improvements have been made in the marketing system since April 1963 so as to allow the banana grower to share 70 per cent of the export prices. Bananas have now become the second largest earner of foreign exchange for the Chinese Government and second only to sugar in importance in Taiwan's export trade.

Processing of such vegetables and fruits as mushroom, asasparagus, pineapple and orange is a booming industry in Taiwan. Measures for close cooperation in assembling and grading of the raw materials are being taken by the farmers' organizations concerned and processors to ensure good quality of the product for export. To prevent undue competition on foreign markets, establishment of agencies to take care of exporting coordination and cooperation among the processors is being encouraged.

Except for the restrictions and arrangements stated above, marketing of farm products is free and open to initiative of individual farmers, merchants and processors.

Agricultural Research and Education

The development of agriculture in Taiwan has been achieved through applied research and demonstration and extension of the positive results of research.

The Botanical Research Institute of the Academia Sinica has been conducting basic research on rice. At the provincial level, four research institutes are carrying on research in agriculture, forestry, fisheries, and livestock, respectively. The Taiwan Sugar Corporation has set up a sugar research institute and the Taiwan Provincial Tobacco and Wine Monopoly Bureau, a tobacco research institute. The seven provincial district agricultural improvement stations carry out experiments and regional trials of crop varieties, cultural methods, and livestock breeds; and they also provide technical backstopping to farmers' associations in extension work.

There are altogether 34 agricultural research and experiment institutions with a total technical staff of 1,097. Of the total technical staff about 70 per cent are graduates of senior agricultural vocational schools, less than 30 per cent are college graduates, and only about two per cent hold master's degrees and/or Ph.D. degrees.

The applied agricultural research work carried out by the Chinese technicians in Taiwan and supported by U. S. financial and technical assistance has brought about many practical results in the last 15 years. Since agricultural development work in Taiwan has reached a point where more research and experimentation with higher technical standards

peanuts threshers; (3) demonstration of artificial rice drying bins; (4) development of tea-pruning machines; (5) improvement and development of jute-decorticating machines; and (6) development of multipurpose grain threshers.

In addition to these, the following activities have also been undertaken: (1) conducting a survey of the current farming methods and requirements of various crops; (2) training power tiller owners and repair mechanics; (3) training farm machinery research technicians; (4) establishing an experimental farm shop; (5) conducting experimentations for the improvement of various implements for crop production and harvesting; (6) establishing a power sprayer and duster testing laboratory at the National Taiwan University; (7) introducing field trial of the Raspador type kenaf decorticating machine; (8) pilot testing of artificial drying of rice and sprinkler irrigation for selected crops; (9) testing the effects of mechanized deep plowing on rice yield, and the effects of different methods of land preparation on rice yield and soil properties; and (10) conducting experiments on the mechanical pruning of tea.

II. THE FRAMING OF AGRICULTURAL POLICY

The highest administrative organ in charge of agricultural policy at the national level is the Ministry of Economic Affairs. To administer the First Four-Year Economic Development Plan (1953-1956), an Economic Stabilization Board (ESB) was created in 1953 and placed directly under the Cabinet with the Premier as chairman. ESB was a policy-making body and consisted of eleven members, including heads of the Ministries of Finance, National Defence, Communications, and Economic Affairs, the

Bank of Taiwan, the Council for U.S. Aid and JCRR. ESB's recommendations on policy matters were either submitted to the Cabinet for approval or referred to competent agencies for action.

ESB had a number of committees under it, each in charge of a specific matter. Committee "D" was responsible for the planning and coordination of agricultural programmes. The Committee's principal task was the coordination of the programmes, operations, and budgets of all the above-mentioned agencies within the frame-work of their own organizations and functions.

ESB was inactivated in 1958 and the duties of its Committee "D" were taken over by a newly created Agricultural Planning and Coordination Committee (APCC) under the Ministry of Economic Affairs. APCC's functions were much the same as those of its predecessors, except that more emphasis was laid on the supply and distribution of fertilizers and pesticides, on soil conservation, and on the development of grassland and livestock in mountainous areas during the period of the Second and the Third Agricultural Four-Year Plan (1957-1964).

APCC was abolished in September 1963 along with the establishment of the Council for International Economic Cooperation and Development (CIECD). The main tasks of CIECD are to coordinate and maintain liaison with various departments of the Government and to integrate projects and sector programmes of various departments into overall economic development plans in order to achieve the objectives of accelerated economic development. Hence there has been organized a Production Committee under CIECD with the Minister of Economic Affairs serving as chairman of the

Committee. Under him are two vice-chairmen concerned with agriculture and industry, respectively. One of JCRR Commissioners serves as the Vice-chairman for agriculture and the chief of JCRR's Office of Planning and Programming serves as the executive secretary for agriculture. To formulate the agricultural plans, eight working groups were organized under the Production Committee, to deal with the different sectoral plans for food crops, special crops, forestry, livestock, fisheries, water and land resources, manpower and economic analysis, respectively. All planning work of the working groups was largely based on the long-range development projections which provide a guideline to ensure a maximum degree of consistency between various sections, fields and aspects of agriculture in the process of further elaboration of plans.

To strengthen the coordination and integration of agricultural programs at provincial and prefectural levels, a number of provincial conferences are held by the Department of Agriculture and Forestry at the start of each year to discuss and exchange views on the prefectural goals and plans of crops, forestry, fisheries and livestock by representatives of prefectural/city governments, farmers' organizations, other public and private agencies concerned and local specialists. Following the pattern of provincial conferences, prefectural/city and township meetings are held at local levels. Their decisions and recommendations are forwarded to the national and provincial government respectively for either action or reference. By such procedures, there is a two-way communication from the Production Committee, CIECD down to township and then from township back to the Production Committee, which helps to a great extent the smooth and successful implementation of agricultural programmes.

The general guidelines which were followed in the past for agricultural development included the development of various agricultural resources, expansion of agricultural production and improvement of farmers' livelihood. Following these guidelines, the basic goals set for the Fourth Four-Year Plan which is now under-implementation are: (1) boosting food production to meet demands of a growing population and for better nutrition; (2) stepping up and diversifying agricultural exports; (3) developing the agro-industries, creating more employment opportunities for rural population and raising the farmers' socio-economic status. It is intended to achieve an annual growth rate of 4.1% in 1965-68 in agricultural sector through the raise of both land productivity and farm labour productivity.

III. AGENCIES ADMINISTRATING AGRICULTURAL POLICY

Most of the agencies mentioned in the previous sections are responsible for both policy making and administration. At the national level, the highest administrative organs are the Ministry of Economic Affairs and the Council for International Economic Cooperation and Development. Being a bi-national organization, JCRR may also be regarded as an administrative agency in the sense that all agricultural programmes and projects financed by U.S. Aid funds are channeled through it.

At the provincial level, the agencies concerned with the administration of agricultural policy are the Department of Agriculture and Forestry, the Food Bureau, the Water Conservancy Bureau, and the Tobacco and Wine Monopoly Bureau. Though mainly an administrative organ, the Department of Agriculture and Forestry has also certain research and

extension functions which are discharged by subordinate research institutes, bureaus and agricultural improvement stations. The Food Bureau is in charge of rice collection and distribution as well as the distribution of fertilizers and pesticides to farmers. The Water Conservancy Bureau has jurisdiction over matters concerning irrigation, drainage, and flood control. The Tobacco and Wine Monopoly Bureau makes and sells cigarettes, cigars, and wines.

At the prefectural and township levels, there is a reconstruction division in each prefectural government and a reconsrcution section in each township office to take charge of agricultural operations and activities. Being basic administrative units and in daily contact with farmers, the township office plays a significant role in promoting agricultural development. It was through the township office that the various land reform measures were carried out at the local level. It is also through the township office that the government's agricultural policy is enforced and crop reporting is conducted.

Aside from the administrative agencies of the government, there are also numerous voluntary organizations that take part in the administration of agricultural policy. Such are the farmers' associations which serve as a two-way bridge between the government and the farmers. The former makes known its policies and programmes to the farmers through the associations, while the latter rely upon the associations to transmit their views to the government. In this way, the government is able to understand the farmers' problems better and is in a better position to work out agricultural policies and programmes that meet the real

IV. FARMERS' ORGANIZATIONS AND THEIR ROLE

There are several kinds of farmers' organizations in Taiwan. They are farmers' associations, irrigation associations, fishermen's associations, and specialized agricultural cooperatives.

All these organizations are voluntary associations working in close cooperation with government agencies to increase agricultural production and promote the farmers' welfare.

Aside from the main purposes for which these organizations are established, they also serve as a sort of bridge between the government and the farmers. It is through these organizations that the government's agricultural policies and plans are made known and carried out by the farmers. Similarly, it is through these organizations also that the farmers' views and problems are brought to the government's attention. In short, the government lays down broad agricultural policies and gives assistance and guidance to the organizations, which, in turn, mobilize the farmers to carry out governmental policies and plans. There exists a high degree of coordination and division of labor between the farmers and the governmental authorities for the development of agriculture in Taiwan.

All the farmers' organizations are democratic in nature and their members elect their own officers and have a voice in the management of the affairs of the association to which they belong. Consisting as they are of independent farmers in all parts of the province, the organizations are grass-root establishments. Through the various activities of the organizations, the members learn to take the initiative and participate in matters that are of vital concern to themselves.

By working in cooperation with their fellow members, they learn the importance of coordinated effort and cultivate the habit of self-help.

There are 368 farmers' associations (342 at the township level, 22 at the prefectural and city level, and one at the provincial level), 26 irrigation associations together with a Joint Council of Taiwan Irrigation Associations, 68 fishermen's associations with a Provincial Fishermen's Association at the top, and six local fruit and vegetable cooperatives with a Provincial Federation of Fruit and Vegetable Cooperatives for Taiwan as a whole. All these associations and cooperatives are organized in much the same way. Each of them is headed by an elected Chairman or President under the direction of a Board of Directors and supervised by a Board of Supervisors. Each one has a general manager or manager appointed by the Board of Directors. All officers of these organizations, except the general managers or managers, serve without pay.

The farmers' associations aim at promoting farmers' interests, advancing their knowledge and skill, increasing their production, improving their living conditions, and developing the rural economy. The functions of irrigation associations are management, maintenance, and improvement of irrigation and drainage facilities; regulation and control of water in canals and settlement of water disputes; land improvement, including wind, sand, and tide control and soil conservation; prevention and elimination of practices harmful to irrigation; management of public properties, including irrigation facilities; and assisting in the planning and

members in the following ways: (1) helping the fishing boats to clear with the coastal garrison when they depart for the fishing ground; (2) rendering services in cooperative marketing and cold storage; (3) providing public facilities for net treating, fish drying, and fish processing; (4) carrying out welfare work among the fishermen; (5) maintaining harbor and shore facilities; and (7) assisting the government in carrying out fisheries improvement projects and collecting statistical data. The fruit and vegetable marketing cooperatives occupy an important position among the farmers' organizations, because they handle annually substantial exports of banana and citrus fruits to Japan and other countries.

The farmers' organizations not only perform different kinds of services for their members, but also do certain jobs for the government. Thus, the township farmers' associations are entrusted by the government with the tasks of collecting the semi-annual installment payments from the farmer purchasers and paying to the landlords the compensation for their land compulsorily purchased by the government for transfer to their incumbent tillers during the Land-to-the-Tiller stage of land reform in Taiwanin the early fifties. The farmers' associations also render services to the government by providing facilities for rice milling and warehousing of rice and fertilizers, and aid in crop and livestock improvement. They collect on behalf of the government 700,000 metric tons of rice and distribute 700,000 metric tons of fertilizer and 100,000 metric tons of animal feed every year. Another important task done by the farmers' associations is assistance in the multiplication and distribution of improved seeds to farmers.

Last but by no means the least is the fact that the farmers' organizations serve as a training ground for the development of local leadership and the cultivation of democratic ways of life. By taking part in group discussions and meetings of one sort or another, the farmers develop the ability to speak and express themselves. Eventually, the ablest among them will emerge as leaders, while the rank and file learn the ruidments of parliamentary debate. Through the system of elections and voting, the ideas of self-government and majority rule are drilled into the minds of the participants. All in all, the farmers' organizations offer the best opportunity for their members to observe and practise democracy in actual operation.

V. AGRICULTURAL INCOME

In Taiwan, the agricultural income rose rapidly over the past 14 years from NT$3, 897 million in 1951 to NT$7,841 million in 1964, in the monetary value of 1952. However, since the national income rose even more rapidly in the same period, the percentage of the agricultural income against the national income declined from 1954 on. The percentage was 39.4 in 1953, but dropped to less than 28 in 1963 and 1964, as shown in Table 1 below:

Table 1. National Income and Agricultural Income 1951 - 1964

*(In monetary value of 1952)

	National income (NT$ million)*	Agricultural income (NT$ million)*	Percentage of agricultural income against national income (%)
1951	11,528	3,897	33.8
52	13,047	4,595	35.2
53	15,023	5,919	39.4
54	15,631	5,211	33.3
55	16,602	5,551	33.4
56	17,505	5,752	32.9
57	18,672	5,994	32.1
58	19,716	6,248	31.7
59	21,073	6,440	30.6
60	22,661	7,737	34.1
61	24,470	7,768	31.7
62	26,005	7,691	29.6
63	27,704	7,519	27.1
64	33,765	9,373	27.8

The decline in the percentage of the agricultural income against the national income does not concern farmers much. What really concerns farmers is farm income per capita, or per worker or per family. Table 2 shows the annual per capita income of the entire nation and that of the farm population including men, women and children, in the same period.

Table 2. Per Capita Income

*(In monetary value of 1952)

	Per capita income of entire population (NT$) * (1)	Per capita income of farm population (NT$)* (2)	Percentage of per capita farm income against national per capita income (2)/(1) (%)
1951	1,370	937	68.3
52	1,505	1,079	71.7
53	1,675	1,351	80.7
54	1,682	1,161	69.0
55	1,718	1,206	70.2
56	1,754	1,224	69.8
57	1,815	1,251	68.9
58	1,854	1,280	69.0
59	1,920	1,291	67.4
60	2,000	1,440	72.0
61	2,094	1,421	67.9
62	2,158	1,391	64.4
63	2,230	1,340	60.1
64	2,679	1,659	61.9

(1) Total population including armed forces.

(2) Total agricultural income including crops, livestock, forestry and fisheries.

During the period under review, the per capita farm income ranged from NT$937 in 1951 to NT$1,659 in 1964, while the per capita national income ranged from NT$1,370 to NT$2,679 in the same period. These data show that the per capita farm income is generally only 60-70 percent of the national per capita income.

The annual farm income on per worker basis instead of on per capita basis, and the per worker income of other industries are shown in Table 3 below.

Table 3. Average Annual Income Per Worker

	Agriculture (NT$) (1)	Non-agriculture (NT$) (2)	(1)/(2)
1951	2,183	6,969	31.3
52	2,564	7,391	34.7
53	3,267	7,975	41.0
54	2,877	8,766	32.8
55	3,063	9,105	33.6
56	3,185	9,725	32.8
57	3,312	9,782	33.9
58	3,446	9,877	34.9
59	3,475	10,221	33.7
60	4,122	10,175	40.5
61	4,063	11,032	36.8
62	3,973	11,714	33.9
63	3,813	12,308	31.0
64	4,663	14,377	32.4

Table 3 indicates that in 1964 the annual per worker income for agriculture was NT$4,663 while that for non-agriculture was NT$14,377. This means that the former is only about 32 percent of the latter. But this direct comparison may be misleading. The farm workers include the family workers, and the farm income includes a good deal of disguised partial unemployment, whereas the non-agricultural workers include only employed workers. Therefore, the above data of the average farm worker may understate the actual average income.

The above comparisons and observations reveal that the total annual agricultural income of Taiwan increased approximately by 2.5 times during the past 14 years, while the average annual per capita farm income was doubled in the same period. Under the present government development policy and plans, it is expected that agricultural income in Taiwan will continue to grow at about the same rate in the years to come as it did in the years under review.

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SEMINAR ON

AGRICULTURAL ADMINISTRATION

(March 9th-12th, 1966)

AGRICULTURE PLANNING AND DEVELOPMENT IN ISRAEL

By

Haim Gratch
FAO Horticulture Adviser.

INDIAN SCHOOL OF PUBLIC ADMINISTRATION
INDRAPRASTHA ESTATE

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Background Information

Geography

Israel lies on the Eastern sea-board of the Mediterranean, between latitudes 29°30' and 33°15' North and longitudes 34°17' and 35°41' East, covering an area of nearly 8000 sq. miles of which about 172 sq. miles are water. The frontiers are disproportionally long, 590 miles on land and 159 on water. The length of the country is 265 miles and the width ranges from 12 miles at the narrowest place and 70 miles at the widest.

Topography

The altitude ranges from 1,286 ft. below sea level at the Dead sea, 665 ft. below sea level at Lake Tiberias, the coastal plains at about sea level and the highest peak 3,692 ft. above sea level is Mount Miron in the north, near the town of Safad in Upper Galilee.

Climate

Although the climate could generally be classified as semi-to subtropical, there are extremes, with tendencies towards tropical and temperate climate, depending on elevation and within quite a short distance we find areas suitable for sub-tropical and tropical plants and others for temperate climate plants.

The temperatures vary mainly with changes in elevation and rainfall decreases as we go South, the lowest (average annual of 25 mm) at Eilat on the Red Sea and highest (1050 mm) in Upper Galilee in the North.

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* Mr. Haim Gratch is Joint Director of Horticulture, Ministry of Agriculture, Israel, since February 1961 on loan to FAO; serving in India as Horticulture Adviser on the Applied Nutrition Programme.

Table 1. Average Min. and Maximum temperature °C and Rainfall in mm.

Locality	January	August	Rainfall
Eilat(on Red Sea)	10.1 - 20.1	26.5 - 40.2	25
Beershela (Northern Negev)	6.2 - 17.0	18.4 - 33.7	200
Jerusalem	5.2 - 12.5	18.1 - 31.5	450
Tel Aviv (Coastal plaines)	8.4 - 18.1	22.1 - 31.5	550
Tiberias (Garden valley)	10.4 - 17.8	24.9 - 36.6	450
Mt. Canaan (Upper Galilee)	4.4 - 9.8	18.4 - 29.2	1050

The average annual number of rainy days is 40-75 (10 to 30 days in the Negev) during November to February.

Agriculture Crops

Due to striking differences in climates, Israel is capable of producing a wide variety of crops and hence diversifying its agriculture. In horticulture crops the country is producing all kinds of vegetables, temperate as well as tropical and in fruit, apples and pears as well as bananas and mangoes.

The advantage in the climatic differences is in the time of ripening and season of growth. The supply of fresh fruit and vegetables can be continuous throughout the year.

Another advantage derived from the climatic differences is that the country can produce fruits and vegetables in seasons of scarcity on the European markets, enabling the development of an export trade, at times when very little competition will be encountered.

Population

The population in 1965 was a little over 2.5 millions as against 770,000 in 1948, when the State of Israel was established. The increase, especially in the first few years was very rapid, mainly due to large immigration of Jewish people from a hundred different countries.

The rate of increase in population was as follows:

1948	1951	1954	1957	1960	1963
770	1,577,814	1,717,814	1,975,954	2,183,200	2,429,000

The rapid increase in population has posed the country two main problems: feeding them and turning them into productive citizens. Planning in Israel therefore had to provide for the rapid increase of the production of food from whatever sources of land and water were available at the time and to plan for new settlements to absorb the new comers.

Stages in the Development of Agriculture

The development of agriculture in Israel could roughly be divided into four stages:

(a) The initial stage when there was a scarcity in almost every essential food and large quantities had to be imported to feed the rapidly increasing population. The aim was to use whatever sources of production available such as land, water, and skilled labour, for production of any food possible. The production was not carefully planned, neither was there a selectivity in kinds of crops to be grown, as long as it was a food product. Under such circumstances the burden fell on the established farmers, that have seen in it an important mission and have done the best they could with the resources available to them.

Production could not catch up with the demand of the hundreds of thousand of people and scarcity resulted in high prices. Government had to take measures to secure a just distribution and fair prices, through rationing subsidies and control of the market.

It is obvious that at this stage the planning has not as yet played an effective role in the production. This was a preparatory period for the planners, when data was compiled, to get ready for the second stage.

Th

(b) Second stage-consolidation

During the second stage more cultivable land and water were made available to old settlements and a number of new settlements mostly occupied by new immigrants came up.

There was planning of production on the basis of the available land, water, and human resources. The planners also took into account the need to assure a balanced diet to the people, the average income per capita and the share of it that could be spent on food. Therefore, it was essential to bring down prices so as to enable the working class to have the necessary food within their limits of earning.

Here is where the work of two important factors came in handy. The research, on the means to increase production per unit area or live stock by improved varieties and strains and improved cultural methods and agricultural research done in stations and in the fields by extension personnel in the initial stages and later on research to reduce the labour input undertaken by the Institute for efficiency studies have been highly significant.

Higher production at lower cost will facilitate reduction in market prices and still leave a reasonable income to the producer. New crops like cotton and sugar beets, which had never before been grown in the country, were introduced and in a short time assumed commercial value. This step has been taken with the idea of widening scope of being self sufficient.

The increase of yields through increase in production and area, has brought about a fall in prices of agriculture commodities, which in return could endanger the reasonable profit of the producer and discourage the farmers. This is especially important under conditions in Israel where a great number of farmers were new to the country and not yet firmly established. This problem has necessitated measures of market control and here is where we come to the third stage.

(c) The stage of stabilization

The main objectives at this stage were to stabilize prices so that they would assure a substantial return to the producer. An easy way out of it, would probably have been by subsidizing the producers. But the economic policy was to minimize subsidies. Controlled marketing was therefore the alternative adopted.

At this stage Production and Marketing Control Boards were established for different agriculture commodities. This idea was not new in the country as there was already in existence a cirtrus control and marketing board that handled all the interests of the citrus industry and marketed all the fruit for export as well as on local markets. The new boards have been set up on the same lines. The board is composed of representatives of the producers, marketing agencies, and consumers, the strength of each being proportionate to their interests. This body is a semi-official body controlled by Government, a representative of the Ministry of Agriculture in chair and representatives of Ministries of Trade and Commerce and Finance as members.

Each board is autonomous to take any decision and well executed by the director of the board (non-official), as long as it is not clashing with interest of the public or general Government Policy. The boards plan the yearly production in short term crops, by allotting quotas of production to settlements or individuals, or by proper feeding the markets according to absorption capacities and taking off surpluses from the fresh market to processing plants, in the case of long term crops like fruit.

The producers are assured with a minimum price for products taken off the market, according to their value, based on the standard of the produce. The funds needed for supplementing the prices come from a levy put and collected from every unit marketed. Government is guaranting the fund and when not enough it is being subsidised. So far this system has worked successfully and very little Government funds have been required. It is interesting to note here that some of these boards, especially the citrus marketing board could divert sums of money

for research projects, especially on problems relating to improvements of fruit for better marketing.

To improve the marketing and keep up with minimum prices, very strict standards had to be worked out and adopted. This has enabled in cases of surplus to surrender to processing plants, the lower grades and leave the higher grades in the fresh market and fetch higher prices. Another outlet for surplus products was sought in export markets, wherever possible.

The timing for these stages was different for the different commodities so were the steps taken. Therefore there was a difference in vegetable production where the stages have come about, in short intervals, while with fruits where the initial stage was entirely omitted and a more detailed planning was required. First working out a master plan on which the development has been based. In general the development of these three phases have taken place between 1948 and 1962/63 when the planning has assumed a somewhat different aspect.

(d) The stage of planning and forecasting for the development of agriculture over a period of 5 years, ending 1968/69. This plan has been prepared by the Agriculture Planning and Development Centre in consultation with the experts in the Ministry of Agriculture, the production and marketing boards and with the cooperation of district officers and regional planning offices. The purposes for which this plan has been drawn up are :

(i) To present a general forecast of the development of agriculture in Israel during the next 5 years.

(ii) To assist the authorities to determine agriculture policy to arrive at competent decisions in matters of production, prices and credit, based on an envisaged development of agriculture.

(iii) Allow for the defining of the possible and desirable extent of the farming branches.

(iv) To supply data for the planning of regional and national enterprises connected with agriculture.

(v) To supply basic data needed for the long term planning of agriculture regions and individual farms.

The planning was based on preliminary surveys and data on potentials that could be made available and economic surveys. Forecasts of the production factors, local consumption, exports and technological development were prepared. The economic investigation included on examination of the dollar rate in tradable outputs and inputs on the international market, a comparison of alternative production plans etc.

The forecast for this 5 year plan is as follows:

Table 2. Land : Increase in cultivable area (in thousands of acres)

Year	Non-irrigated	Irrigated	Total
1962/3	591.56	360.65	952.30
1964/5	682.4	372.5	1054.9
1968/9	613.7	385.15	998.85
Percentage growth	3.7	6.8	4.9

(1968/9 as compared to 1962/3)

Table 3. Water supply forecast for agriculture (in million cubic meters)

Year	Sweet water				Saline water
	Net quantity	waste	Flooding	Gross Qnty.	
1962/3	950	30	-	980	73.1
1964/5	970	33	-	1,003	73.5
1968/9	980	35	35	1,050	73.5
Percentage growth	3.2	16.7	-	7.1	-

Demand forecast is illustrated in the following table

Table 4. Present population, net income per capita and per capita expenditure

Year	present population in '000	Net income per capita (in prices of 1962/3) -IL	Consumption expenditure per capita -IL
1962/3	2,356.5	2,398	2,115
1964/5	2,490.8	2,566	2,244
1968/9	2,848.1	3,119	2,625
percentage growth	20.9	30	24

Basis for planning horticulture (fruit) development

As development of fruit trees is a long term affair, the results come after a few years and the trees will exist for quite a long time, requiring a more careful planning before planting.

I shall therefore try to describe in brief the guide lines for planning this branch of agriculture.

1. Steps in planning fruit culture

   a. Collection of data on availability of area and production potentials.

   b. Determining the portion of fruit and fruit products to be included in the basket of food.

   c. Survey of potential areas.

   d. Preparing a master plan for the whole country based on suitability of different species to locality.

   e. Preparation of planting material.

2. Guide lines for planning

   a. Technical suitability.

   b. Economic feasibility to assure proper income to the grower.

c. Interest of national economy, to give preference to crops with an outlook for export, whether it would take the place of an essential food that cannot be produced elsewhere.

d. Safeguard the interest of localities that are limited in selection of crops. For instance in the case of plums that could be grown successfully in the plains and hills, however the plains could grow a considerable variety of crops, horticulture (especially citrus and subtropical fruit) and others with greater success and lower cost of production as the soil is better and water is available at a lower cost. If the plains farmers would have taken to plum culture they would easily compete with the hill farmers where the selection of crops is limited. Therefore the plums have been diverted mainly to the hills.

e. Safeguard the interest of new settlements that are coming up gradually and part of the quota of fruit culture has been reserved for those settlements.

f. Economic production, to get the highest income from water or other inputs.

Execution of the Plans

1. Surveys

a. Land: The preliminary work was to survey the country for land use potentials, indicating the suitability of areas for cultivation of different crops. The results were of great importance for planners on a country wide basis as well as for the individual farms.

By 1963 altogether 3,637,000 acres have been surveyed for land use, out of the total acreage of 5,175,000, of which 2,728,500 acres have been mapped.

Table 5. The increase in cultivated area

Year	Irrigated acres	Total acres
1947/48	75,000	400,000
1953/54	240,000	900,000
1962/63	360,650	952,300

b. Water

All water sources have been surveyed and plans for distribution worked out.

One of the main objectives was to pool all resources and evenly divide to the different parts of the country, and carry the water from richer sources in the north to the desert area in the south where vast areas of good land are available and are useless without irrigation. This scheme known as the national scheme for irrigation has been carried out in steps. When final it will utilize 1,770 million cubic meters of water and provide enough water to irrigate only half of the irrigable land. For additional quantities the country is looking to the sea and brakish water and intensive research programme is on the way to disalinate these waters.

Administrative supervision was entrusted with the Water Commissioner and his office controls all sources of water in public as well as private sector, surface as well as underground. The Water Commissioner's task is also to keep an eye on the quality of the water. The tube wells are constantly inspected and water tested for salinity and when it comes up to the danger point preventive measures are being taken.

It was the task of the different technical departments in the Ministry of agriculture to supervise the execution of the development according to the lines laid down by the planners. As the

technical personnel of the departments were involved in the planning, the plans were clear to them and they could give the proper guidance. However advice alone was not always enough to convince the farmer to take up the crops recommended, in that case administrative measures had to be taken in the way of not recommending the grant of loan from the development budget.

Development loans have been offered to farmers at a rate covering the initial investment in machinary and material but not labour. Every application for a loan had to be approved by technical personnel and this was the only measure that could be taken to enforce the planning. The duration of loans differed from crop to crop depending on how soon it came into production. In the case of plantations (with exception of bananas) the loan was on long term basis and the repay started after the fifth year.

The Role of Extension

The extension staff are directly under the charge of the departments which are on a specialised basis so that the department of citrus deals only with citrus and poultry department with poultry only.

Each department consist of a director and subject matter specialists in the centre, and instructors situated in the regions. Their task is to give guidance in day by day practices, bring to the notice of the farmer new development in research. If the instructor is capable and willing, he may also carry out field experiments on new thing and the results made available to the farmers of his region and when results applicable to other parts of the country it is given wide publicity. These field experiments have been encouraged at the beginning when the research station could not cope with all the problems that arose in the fields. However this was not the case in later years when the instructors had their hands full in guidance.

The instructors dealt with the farmers directly, or through a village leader. In the new settlements a local instructor

in their first steps not only in agriculture but also in community development and he was actually their leader in every respect. These local instructors were volunteers from established settlements. They were guided by the departmental instructors and have been very useful in the villages till local leaders have come up.

Results

The results were quite rewarding and by 1963 the country was self sufficient, or almost self sufficient in meat (to a large extent from poultry), dairy products, eggs, vegetables, potatoes (including seed potatoes), and fruit, but still has to catch up with fish, oils and fats. In cereals only about 16% is being produced locally, the rest has to come from outside as the country does not have sufficient area for cultivation of cereals.

To illustrate the accomplishment some figures are reproduced from the Foreign Agriculture Economic Report No. 27 of the Economic Research Service of the U.S. Department of Agriculture entitled, "Change in Agriculture in 26 Developing Nations 1948 to 1963".

Table 6. Annual rate of change in population growth, per capita income, and domestic food demand 1950-1960 Israel and India.

Country	Annual population growth rate %	Annual increase in real per capita income %	Annual increase in food demand %	Total annual demand increase %	Percentage of annual demand increase accounted for by population growth %
Israel	5.2	2.5	1.38	6.54	79
India	2.0	1.7	1.36	3.36	60

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Table 7. Trend in Agriculture output, annual percentage rate of change in crop output 1948-63, 1948-55 and 1955-63

Country	1948-63 Annual compound change in total crop output %	1948-63 Population growth rate 1950-60 %	1948-63 annual compound change in crop output per capita %	1948-55 Annual compound change in crop output %	1948-55 annual compound change in crop output per capita %
Israel	9.7	5.2	4.3	15.9	10.7
India	3.1	2.0	1.1	3.2	1.2
High(1) average	5.5	3.0	2.3	6.9	3.9
Low (2) average	2.3	2.1	0.2	2.0	0.1

	1955-63 Annual compound change in total crop output.	1955-63 Current population growth rate.	1955-63 Annual compound change in crop output per capita.
Israel	5.7	3.5	2.1
India	3.0	2.4	0.6
High average (1)	4.5	2.8	1.5
Low average (2)	2.4	2.1	0.4

(1) Average of more developed countries
(2) Average of the less developed countries.

The figures selected here are to give some indication in the trend of development and achievements. The reader interested in more details is referred to the original publication.

Cooperative Movement in Agriculture in Israel

The cooperative movement in Israel could be divided in three main catagories:

(a) Cooperative farming;
(b) Cooperative marketing; and
(c) Cooperative buying

(b) Cooperative Marketing: This movement is very widely spread and handles all the kinds of agriculture commodities.

There are different organisations for local marketing and export marketing.

The cooperative, handling export of fruit, are mainly those handling citrus fruits. There are three cooperatives handling the greater portion of the fruit. These cooperatives as well as the private dealers are members of the Citrus Control and Marketing Board and the marketing is done by the board. However cooperatives are handling the fruit from the orchard to the boat. The cooperative is giving picking directives advance money to the growers and render services like spraying, fertilizers etc.

Local marketing is handled by three cooperatives and over 60% of all agriculture commodities is being marketed by them. These cooperatives have marketing centres, stores and cold storage, in a great number of cities and towns and milk collecting and processing plants, in the major cities. The membership of these cooperatives comprise of collective settlements and private farmers from other settlements.

(c) Cooperative Buying: Purchase cooperatives are more restricted. There are 2-3 such cooperatives with central stores and branches spread all over the country. They handle practically all commodities as food, farm supplies, clothing, etc. One of these cooperatives has also developed a movement of cooperative stores, mainly for food and clothing and a wide chain of such stores have been opened in almost all cities and towns.

Conclusion

The factors affecting the agricultural development in Israel were numerous, the most important amongst them were:

(a) The farmers themselves and their organisations, saw in their work not only a source of income but were wedded to the goals of development.

(b) The Government technical personnel that have worked long hours teaching the farmers, new and old.

(c) Easy terms of development loans that enabled almost every farmer to increase his production.

(d) The cooperation of the population as a whole appreciating the efforts and waiting patiently for better times to come.

(e) The research personnel, have worked hard to find improvements and made their findings known as early as possible to the farmers.

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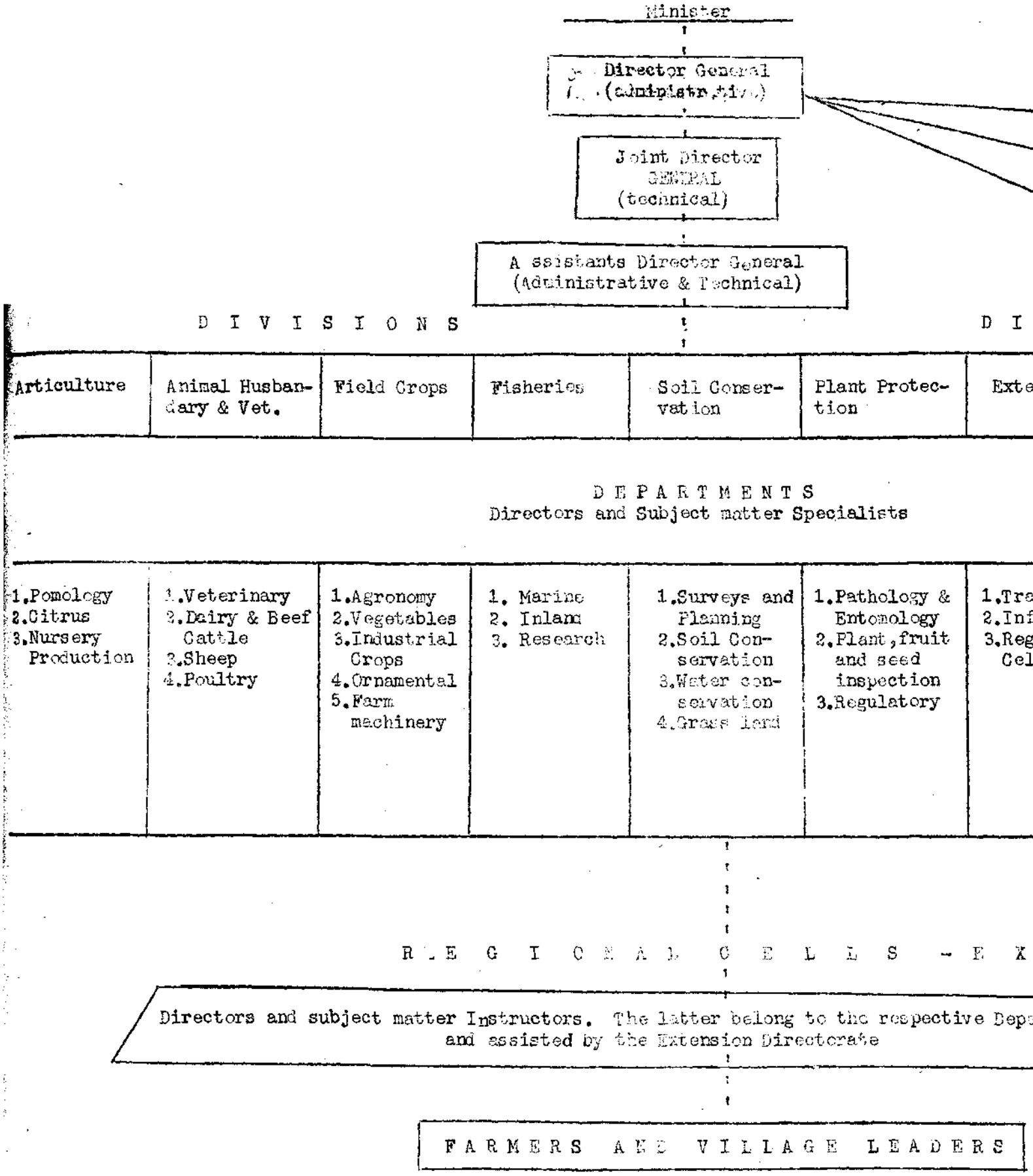
ADMINISTRATIVE SET UP OF THE MINISTRY OF AGRICULTURE IN ISRAEL



Forestry is a joint enterprise of Ministry of Agriculture and Jewish National Fund.

Farmers' Organization

There are farmers' organisations for each branch of Agriculture. They are working in cl the Departments, helping with the extension work, training and marketing.

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PROBLEMS AND POSSIBILITIES IN PLANNING FOR AGRICULTURAL DEVELOPMENT *

J. Herbert Snyder
The University of California at Davis.

Planning for agricultural development must focus on agricultural problems - but it must also be contained within a broader framework that reflects consideration of a nation's total economy. In recent years there has been a great increase in the study of economic problems of developing countires. The first great strides came with the Marshall Plan during the reconstruction period. Experience gained in Europe was applied to a world-around divergence of situations and problems, with somewhat mixed success. More recently, fundamental analysis of development economics and associated problems has begun to add a broader base as well as greater depth and insight into the consideration of individual countries. Success of the applications, however, has been varied - perhaps because of failure to acknowledge some of the specific factors that constitute barriers to planning for accelerated economic growth.

This paper specifies some of these factors encountered in relation to planning for agricultural development in a developing country. Such obstacles will continue to plague nations until planning, on an intensive and well-coordinated basis, becomes a vital part of a government's activity. They also present situations that must be faced and overcome by the planning agency and planning agents.

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Level of Discussion

The organization of the Pakistan government - a central government administratively superior to two provincial governments - complicates both the planning and the project implementation processes.[1] National concern with the ever-present problems of geopolitics creates additional constraints. The geographic location of the two wings of Pakistan, separated from each other by 1,200 miles by air, or 3,000 miles by sea, as well as divergences and differences in language and other cultural factors, make it difficult to generalize from the national to the local level. The competition, and at times even conflict, between the two provinces would add a new dimension to the problem under consideration.

Consideration of problems and possibilities is concentrated at the provincial level because of greater opportunities for direct tie-in between administration, planning, and project implementation. Within the province of West Pakistan, successive subdivision into divisions and districts, with both parallel and overlapping technical and administrative organization, introduces too great a mass of detail to permit even a brief consideration. For these reasons it seems appropriate to concentrate discussion at a "medium" level the West Pakistan provincial view-point.[2]

Resources and Agriculture

The planning process assumes knowledge of resource availability. The basic resources characteristic that dominates a discussion of planning for economic development in Pakistan is the overabundance of unskilled human resources and the unparalleled dearth of material resources other than land and water. With such a resource base, it is not surprising that agriculture is the most important segment of the economy: approximately 50 percent of the Gross National Product is accounted for by agricultural production, and nearly 75 percent of the civilian labor force is engaged in agricultural production. If one adds the value of manufacturing added to agricultural products and the labor force engaged in processing

agricultural products at primary stages of manufacturing, the importance of agriculture is even more striking.

The characteristics of agriculure in Pakistan are similar to those encountered in most of the underdeveloped nations of south and southeast Asia: small-sized and fragmented holdings of agricultural land, low production per acre or per agricultural worker, overdiversity in crops grown, primitive production and cultural practices, low per-acre yields, difficulties of operation, and insecurities of tenure are all dominant features.

The services provided to agriculture in Pakistan are inadequate at best. Improvement of the credit structure for agriculture has been one object of a comprehensive study there.[3] Marketing facilities are primitive and are frequently totally lacking in terms of supplying reasonable assembly, collection, and transport services on an aggregated basis. The extension services provided by the government are, at present, only a beginning. A land-oriented resource base combined with inadequate services to agriculture have helped keep agricultural production at a low level for many years. Such was the situation in agriculture when government planning was begun in an effort to stimulate over-all national ag-economic growth.

The Five Year Plans of Pakistan[4]

The five year plans present programmed steps in planned activities that serve as guidelines for growth of the nation. These plans are comprehensive and coordinated attempts to harness the human effort and physical resources of the nation to the maximum extent possible in order to raise the living standards of the people. They have as broad long-run economic and social objectives the following: higher standards of living, equitable distribution of wealth (so long as incentive is not eliminated), universal education in accordance with talents, victory over disease, restruc-

the east and west wings of the country culturally, via literature, art, and sciences.

The overriding consideration in structuring these plans has been that of striving to maximize the rate of growth of natural income. However, it has also been necessary to take into account the impact of other important objectives, such as the desire for self-sufficiency in food-grain production, acceleration of regional development, improvement in the balance of payments, and increase of employment opportunities, and the need for large-scale expansion of nationwide education and training facilities. Furthermore, plans subsequent to the first must provide for completion and/or modification of schemes in progress. It was unfortunate that more schemes were formulated, proposed, accepted, and even begun, than could be accommodated by the first five year plan. Fortunately, this has been minimized under the operation of the second five year plan.

In evaluating the performance of the nation under the first five year plan, it must be recognized that although it covered the period 1955-59, it did not receive formal approval of the Pakistan government until 1957 and then received full government support only after the regime of President Ayub came into power in October 1958. In examining specific attainments of the first plan, it is observed that the target of raising gross national product by 15 percent was met only with an achievement of 10 percent. The goal of a 7 percent increase in per capita income was reduced in achievement to something approximating 3 percent - a gain that barely maintained economic stablity. Approximately 98 percent of the total financial allocation was actually expended - but inflationary problems restricted attainment of physical accomplishment to about 75 or 80 percent of the physical targets of the original plan.

Failure to attain targeted agricultural production increases was a particularly disappointing feature of the first five year plan.

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Instead of an expected increase of some 9 percent in total food-grain production, agriculture barely held its own during the first five year plan period. Required expenditures for imported foods were double that allocated for the period. In field other than agriculture, industrial growth attained its target, and the water and power development areas were only slightly below target. In over-all evaluation, and particularly for agriculture, the first five year plan failed to achieve the targeted growth levels.[5]

The major causes of shortfalls in implementation of the plan are officially recognized. Increased nondevelopment expenditures necessary to keep the national economy on an even keel exceeded expectations, thus cutting slightly the available financial resources for development expenditures. The foreign exchange earnings fell short of the projections used in the plan. Arrivals of foreign aid were somewhat slower than expectation - although it should be noted that use of foreign aid arrivals was even less than the arrivals. A considerable rise took place in both internal and external prices, thus upsetting cost calculations basic to the first five year plan. Adverse uncontrollable factors, such as unfavorable weather and deterioration in terms of trade, were quite serious. Many projects took longer to complete than was expected due to the deficient advance planning as well as shortages of key personnel, equipment, and materials. Coordination between various government agencies was less effective than desired. Above all, there was failure to observe the discipline of the plan.

The goals of the second five year plan are more realistic than were those of the first. Experience gained during the first plan period, development of more reliable and complete information to serve as a basis for planning, greater stability of government and its total agency organization, as well as increased confidence

The two five year plans have set forth systematic analysis of the economic needs of the nation and presented general guides for reaching the goals that will eventually provide a firm basis for the economic take-off of Pakistan. Thousands of manhours of conference, study groups, public hearings, major and minor investigations, etc., have gone into the process. The financial cost of the planning process itself has been substantial in terms not only of rupees but also of dollars, pounds, marks, and other currencies.[6]

The two five year plans are good plans - to have said, ex ante, "they are the best" would have been indiscreet. To make a similar statement now would be hasty, until sufficient time passes that accomplishments as well as objectives may be better evaluated. But the path over which these "good" guides have passed has not always been smooth. Identification of some of the major barriers encountered in planning for the development of agriculture and suggestion of possible solutions are the primary objectives of this paper.

Technical Agricultural Problems Characteristic of Developing Countries

There are several types of problems that restrict efficient technical performance both within and also between the agricultural and non-agricultural sectors. These include overly great compartmentalization and insufficient coordination of function, inadequate levels of technical ability and services at the field level of operations, and related to this latter need, the relatively inferior status of the person working in the general fields of agriculture.

Compartmentalization of function exists within the agricultural sector arising from multiplicity of departments charged with ostensibly different but actually similar functions. For example, the departments of agriculture, cooperatives, colonization-settlement, Board of Revenue, and irrigation all have separate schemes dealing with settlement-colonization of people on newly

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developed land. There are, for the most part, independent of each other and independent of related departments such as the animal husbandry, forestry, fisheries, engineering, Village-AID, tribal affairs, etc.

The Thal Development Authority in West Pakistan was the first major attempt to provide for a coordinated and integrated development program.[7] Inadequate attention to physical characteristics of the land primarily in terms of drainage needs at the outset of project development has resulted in loss of substantial areas from cultivation even before completion of the project. Insufficient planning with regard to such details as initial credit needs of settlers, adequacy of markets and marketing facilities, production services, and other pre-settlement development needs has resulted in less than hoped for accomplishments. But the Thal Development Agency did establish the fact that unified administration has much to offer in speeding the pace of agricultural development in Pakistan.[8]

Overcompartmentalization of function was self-perpetuated by the training institutions until recent adoption of the schemes for establishment of agricultural universities in Pakistan. The colleges of agriculture were, and for the most part still are, primarily concerned with factors relating to plan production. The colleges of animal husbandry are concerned primarily with problems of animal diseases and pathology. Cooperative training institutions train personnel to work within the confines of the Cooperatives Department. These is little concern for the role of cooperatives in agricultural financing in relation to over-all credit operations in agriculture. There is even less awareness of one important role that cooperatives must play in establishing better marketing facilities. To only a limited extent is there cross-fertilization of ideas between the rigidly demarcated departments. Consequently, many important problems relating to two or more specific disciplines

agricultural credit and finance is considered in a non-agricultural atmosphere; animal nutrition and food and fodder production are not seriously studied in either the agricultural or the animal husbandry departments; the economic problems of agriculture are not sufficiently researched in any agriculturally-related department, and the departments of agricultural economics are primarily focused on studies of short-run production problems, more within than without the crop production problems of the department of agriculture.

Such problems could be solved under existing organizational structure only if the leadership of the various departments presents sincere evidence of a desire to cooperate effectively. The problems attendant upon improving agricultural production in most of the underdeveloped countries are so great that no one should worry about perpetuating or expanding a personally vested or parochially oriented interest.

Internal planning for agricultural development by the separate departments does not present coordinated programs - primarily as a consequence of department compartmentalization and its self-perpetuation through the training methods usually employed. For example, land consolidation schemes that fail to include at the very outset consideration of and provision for inclusion of irrigation and drainage facilities, production and construction credit, tax and water toll equalization, farm management reorganization, and a healthy and effective agricultural extension service, are not apt to be overly successful. Triangulation of the cultivator's fields based on a subjective soil survey will not necessarily provide the same field patterns that would result from an objective soil survey considering the probable impact of irrigation and drainage needs. Construction of irrigation and drainage facilities after consolidation and based on an incomplete soil survey may lead to complete loss of the benefits (contiguous fields, larger parcels, uniformity in size and shape of fields, etc.) gained from consolidation. The compounding of these difficulties when combined with the omission of consideration of credit

needs and the other factors mentioned above can easily invalidate within a few years any short-run gains made from the original consolidation program. Similar difficulties face any land settlement program that is based on insufficient coordination and cooperation between the primary nation building departments. An agricultural development corporation, fusing the functions of separate departments into a coordinated mechanism, can serve as a worthwhile vehicle to overcome many of the problems attendant upon overcompartmentalization.[9] Coordination with the planning units will also be more easy and more effective under such a situation.

Lack of communication between agricultural and non-agricultural sectors further complicates the attainment of development objectives. Whether "balanced" growth or "unbalanced" growth is the more appropriate goal for development planning is not relevant. Regardless of the goal, attainment is made more difficult by losing sight of the fact that in most developing economies new and expanding industrial growth is inextricably linked to agriculture. Plans and targets for one sector cannot be made nor effectively attained without regard for the other sectors.

Location of industrial activity must consider sources of raw materials - and in a nation such as Pakistan this means in large part centers of agricultural production - as well as sources of labor and product markets. Location of a large textile mill so that unemployed labor from agricultural areas may be used is all well and good - unless both raw materials and finished products have to be transported long distances to and from the mill at excessive costs. Location of transportation facilities should be so as to maximise potential usefulness in fulfilling the marketing function for agriculture and industry - not just to fulfill political ambitions and commitments.

Without exchange of information, plans, and goals between

if not impossible.[10] A frequent and somewhat hopeful observation was made that inadequate coordination between departments and sectors was was more noticeable at the national and provincial level than at the local or field level. Appreciation of and concern for the problem of industrial growth in a nation such as Pakistan can help the agricultural planner do a better job. But the converse is even more true-primarily because of the excess human resource merely subsisting in an area poor in all basic resources except land and water.

The generally unsatisfactory but always widely variable technical ability encountered at the field level among operative personnel charged with implementing agricultural development compounds the difficulties of planning for agricultural development. The individuals at the field level invariably are without awareness of the relation of their individual actions and programs to the over-all national goals in economic growth and development. The individual is often unable to see either the significane of or the need for improvement in operative programs. Some improvement has occurred, and more is anticipated in coming years. But much more is needed to overcome the inertia existing at local levels.

Some of the difficulty is to be found in the relatively inferior status of agricultural workers at the field level. In part this is merely a reflection of the centuries-old heritage that has assigned low-level status or caste to farmers and cultivators. Agriculture finds itself in a relatively unfavourable position with respect to pay, work conditions, perquisites, etc., when compared with similar positions of other governmental service units.[11] Individual fieldworkers desire to improve themselves at least enough to get away from the remote field stations and field positions into larger communities so that improved perquisites may be obtained. The working conditions of field extension personnel are frequently primitive and may in fact be in areas that suffer from health and disease problems as well as unfavourable physical

working conditions. The most productive workers are soon promoted from field level positions, leaving the relatively inferior workers in the majority at the primary field level.

There is often lack of delegation of responsibility from supervisors to field level personnel-primarily as a result of deficiencies and inadequacies of field level workers. Even with properly qualified field level personnel there is failure to assume authority because of an unwillingness to "buck" the system. Recommendations for promotion and advancement have been withheld because of real or fancied slights or invasions of authority on the part of field level workers with respect to their immediate supervisors. Individual initiative, when it does appear, is frequently stymied and even eliminated as a result of the operation of a relatively rigid and inflexible departmental table of organization. These paradoxes make implementation of agricultural development programs at the field level extremely difficult.

Results of research investigations are not reaching farmers in a satisfactory manner. Significant agricultural research of a relatively high quality is under way at agricultural colleges and field stations in West Pakistan. A lack of communication channels deters dissemination of information from its basic source to the field level where the needs exist. Lack of follow-up and lack of continued exposure of the cultivators to research findings are the results of personnel shortages, fund shortages, or both. Personnel and funds are often spread too thin to permit effective use. Thus it becomes impossible to provide satisfactory demonstrations for even small numbers of peasant cultivators on any sort of regular or intensive basis.

Many of the individuals employed on demonstration projects have not been satisfactorily trained in basic communication skills nor in stimulating local interest. To translate and communicate

information into practice, requires dedication to the villages and to the extension type of training program. Failure to provide demonstration agents with specific assignments or projects that can be undertaken at the village level constitutes a significant barrier to more rapid adoption of the improved practices and changes in farming operations that would benefit both the individual cultivator and the nation at large.

Although significant research undertakings are available, it is regrettable that much research is repetitive of work already performed in other areas. There is a tendency to duplicate procedures rather than to try to build new information. This results from inadequate numbers and inadequate levels of training of research personnel, as well as from improper supervision and coordination from higher levels. At times, lack of technical competence is combined with an unwillingness to either assume responsibility or delegate authority. When carried to extremes, the result is to perpetuate a "safe" but non-progressive hierarchy within which little if any significant accomplishments are possible. Better paid and more competent supervision of total research programs will provide more effective answers to many of the basic agricultural problems of countries such as Pakistan.

Inadequacies of the services provided to agriculture in general and in the extension service in particular have been mentioned earlier. Improvement of the extension service, however, requires simultaneous examination and analysis and re-orientation of the several agricultural extension services, the Village-AID organization, and the National Development Organization. Until such time as major improvements are instituted in the extension services, dissemination of information will be inadequate and incomplete and the necessary gains in agricultural production will not be achieved.

Inadequacies in marketing services further perpetuate a hand-to-mouth type of agricultural production. Specific needs are

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identification and adoption of grades and standards, modernization of collection, assembly, and storage practices for agricultural products, and establishment of unified outlets for the sale of these agricultural products. At no level of the marketing activity is there adequate grading or standardization of the agricultural products. Grades and standards and potential benefits associated therewith are not understood by the individual cultivator. As great as this need is, however, the present low levels of production, size of agricultural holding, and inertia of the individual cultivators cannot be expected to stimulate the independent establishment of comprehensive marketing services. Until the more basic defects in the agricultural production structure are rectified, the inadequacies of the marketing system will not be fully recognized, let alone overcome. As productivity and production expand, however, and as the more basic agricultural reforms begin to come into effect, the serious insufficiencies in the total marketing system will make their presence felt.

The major impact of over-all deficiencies in agricultural credit has long been recognized. The problems of this particular sector have been clearly identified by the Credit Inquiry Commission of the Government of Pakistan.[12] An effective credit system for the direct benefit of the primary agricultural producer has not yet been developed-but is vital to long-run success in increasing agricultural production. The tendency for credit to gravitate toward substantial elements in the community and be denied to low income groups has yet to be overcome. The cooperative credit movement-which has been identified in both the first and second five year plans as a most significant possibility in the field of agricultural finance and credit-has become virtually stagnant at the primary level, thus making it virtually impossible for individual cultivators to obtain funds easily at the field level. Adoption of

field of finance and credit.[13] Once again, however, the inadequacies in the basic credit services available to individual proprietors make it extremely difficult for the individuals to engage in development activities that can improve their personal well-being as well as contribute to the total growth of the nation.

Concentration of effort on a single or most on a very few ideas to improve agricultural productivity is a frequently encountered suggestion for underdeveloped nations. For example, concentration on manufacture of fertilizers-even though at a cost greatly in excess of foreign fertilizers f.o.b. Karachi-and their distribution and widely disseminated use has been seriously offered as the primary key to rapid expansion of the agricultural output of Pakistan.[14] It is the contention of this paper, however, that such a program would at best be a very short-run solution and basically the deep-rooted causes of low agricultural productivity would still exist. Furthermore, the immediate (possible) gains from such a program would be rapidly eroded until little if any benefit would be left for the longer run. The wisdom of the first philosopher to observe that one should not put all of one's eggs in a single basket still serves as an appropriate motto for the development economist and planner.[15]

"Crash" programs are of only limited value in developing countries. If a concentrated effort, in terms of personnel, funds, and materials is made on a sufficiently intensive scale, and covering a sufficiently long time period to produce observable results, then broad-based and lasting stimuli to improved agricultural production can be attained locally. In a nation suffering from acute shortages of trained technicians and development funds, this will likely mean that some areas must go without any increased help from government-and perhaps even suffer some reductions. But intensive concentration on the most productive areas with the greatest capacity to absorb the total array of inputs will pay off in relatively greater outputs. These excess outputs can then be more easily

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concentrated and distributed throughout the economy. On the other hand, a crash program that attempts intensification on all levels for 60 percent of its agricultural areas is apt to produce insignificant results-and at an increased cost to the economy. Nor would cost increases be limited to monetary considerations, as loss of the confidence of the people in government-sponsored programs will delay over-all improvement in the nation's agricultural production. Concentration of effort can be effective in increasing agricultural productivity and should be a part of most development programs. Much restraint is required, however to keep the program from being diluted to the extent that the hoped-for "crash" effects materialize only as an insignificant "thud".

Administrative Problems

Administrative problems include barriers to planning for agricultural development resulting from organizational or structural characteristics of government or industry. These characteristics may be a product of the specific form of organization, such as lack of coordination between the planning and implementation arms of government. Or they may be a product of culture, mores, and history, such as the vested interests of leaders in government or industry traceable to family, tribal, or "caste" influences.

Lack of effective communication between the several units of government administration concerned with national growth lessens the effectiveness of planning for accelerated economic development. The failure of government to provide either the planners or the departments who must prepare and present plans with an idea of the amount of financial resources available for development expenditure is an all too frequent illustration. This is more serious than most inadequacies of communication between departments and constitutes a major administrative obstacle. Forecasts of financial resources

can be both stablizing and helpful in balancing conflicting objectives of specific development programs as well as serve as guiding criteria to the planner and to the departments presenting plans. But advance availability of budget targets is the essential element.

Lack of coordination between planning and implementation slows the rate of completion of development projects. It is highly desirable that there be a close coordination, if not a physical oneness, between the planning agency and the implementing agency; or at least between the planning agency and the agency charged with evaluating and inspecting progress of developments. A three-way tie between planning, financing, and implementation is a highly desirable feature of administration that will make planning for development and the attainment of development more effective. For these three functions unity should be the important characteristic; competition is likely to lead to unfulfilled accomplishments.[16]

Duality of technical and administrative structure in government is encountered throughout much of south and southeast Asia. This dualism of organization is wasteful of a limited resource-trained manpower. More important from a development standpoint, however, is that technical projects may be both instigated and reviewed by persons with little or no technical competence. Equally serious is the situation where technical personnel attempt to either block or foment organizational changes in the administrative structure that make the administration of the total government program more difficult. There needs to be an adequate safeguard for the administrator as well as for the technician. This could be attained by a form of organization that would provide for the senior administrator, in nation building departments in particular, to be a technically competent person. This would call for major changes and major revisions in the training programs of government servants. It would also call for a substantial change in the attitudes of administrators vis-a-vis technicians. The possible gains to be had from change into a single form of administrative structure, however,

would appear to be significant.

Parochialism within government structure is still to be observed in spite of the political unification of the several areas of West Pakistan in 1955. There does not appear to be sufficient control by central authorities to coordinate programs in the several geographic areas. There appears to be over-emphasis given to "paper parity" between the areas and also to interprovince parity. This concern may lead to adoption of questionable projects to satisfy purely political obligations. It may well be that certain projects must be undertaken because of political considerations—but government should be aware of the costs of such steps and be willing to admit to the cost. Furthermore, government should so organize their undertakings that it is clear both within and without government when political pressures are forcing decisions and when planned economic considerations are determining the final decision. The planning authority ought not be required to bear the burden of the political faux pax.

Failure to coordinate goals for agriculture and industry can often be traced to basic differences in the manner in which an industrialist or an agriculturalist operates his business. These differences should be of concern both to the private enterprise sector and to the government administrator sector but are frequently completely overlooked.

The relative ease of control over industrial capital and the amount of capital controlled when compared with agricultural operations tends to evoke overly discriminating attitudes on the part of government agents. Typically, the scope for efficient capital management in agriculture is weakened by limited size, extreme diversity, and non-contiguity of the operation. In industry it is easier to develop an economic-sized unit with greater degree of control and centralized operation. Economies of scale attendant on mechanization and expansion are more easily realized in the

in agriculture is far greater and more difficult to introduce than in industry. Planning for these two types of operations must take into account these basic differences.

Other difficulties, such as the traditional lack of mutual regard between industrialists and agriculturalists, the relatively great gap in proficiency of performance between the industrial and the agricultural labor force, and the inadequate provision for plowback of capital in agriculture also fall within the sphere of administrative and monetary-fiscal control. To the extent that these differences are recognized, planning for agricultural development will be more extensive and will attain more favorable growth.

Vested interests displayed by both private and public officers are frequently encountered by a planner. Persons who by hard work or accidental inheritance have reached positions of affluence or power will be understandably concerned with the probably impact of development schemes on their own standings and situations. Planning for accelerated economic growth often means that certain relatively well-off groups must give way to a general attainment of improved growth and economic affluence on the part of the total society. Relative position and relative strength of individuals are apt to be altered. Thus, a planner may encounter objections to development projects from small but influential groups that may be relatively disadvantaged if the objectives outlined for the total society are attained. Fortunately, such attitudes are being diluted by rapid expansion of government officer services and private investment opportunities. Dedication to duty on the part of most officials minimizes general difficulties, but even one such vested interest, located at an apex of decision-making authority, can constitute a serious barrier to effective planning.

The Human Element

A nation such as Pakistan suffers from an inertia that can

best be overcome through universal education. The bias of this paper suggests that such education should concentrate upon basic agricultural and technical skills. Regardless of orientation, however, the education process itself will gradually develop an awareness of the opportunities for improvement of the individual. But until the benefits are diffused throughout the entire nation, difficulty will be encountered in overcoming the countrywide resistance to change and improvement.

The population surplus characteristic at the village level is a further deterrent to intensification of work habits-in fact, it may lead to intensification of local inertia. It is relatively easier to stimulate educated people into increased economic activity.[17] Until such time as the educational attainments of the individual village proprietor and cultivator provide such a stimulus, however, it may be necessary to activate individuals through a penalty system, rather than through an incentive system.

The question of rewards and incentives in a nationally self-disciplined attainment of goals is reminiscent of the old fable of "The Carrot or the Stick."[18] In considering prospects for target attainment in an underdeveloped country, the planning agency and the implementation agency must constantly weigh the merits of encouragement and incentive-the carrot-versus penalty-the stick-as the means to reach the desirable end. Penalty may be more productive than incentive in encouraging increased productivity in underdeveloped areas. This appears to be correlated with lack of basic education throughout the economy and a population heavy with inertia. It has been observed in agriculture that the cultivators may frequently be penalized into increased production and accelerated development by a program of taxation that makes compulsory national saving a necessity. This is not to state that this is the only manner in which accomplishments can be made: but it is to illustrate that the "stick" can be as important as the "carrot."

agricultural production response to price stimulus. On the other hand, significant production responses have been observed as a result of such measures as increased taxation or land reforms.

Population pressure problems so characteristic of south and southeast Asia are concentrated in a basic agricultural economy. Agriculturalists are traditionally underemployed because of the small size of their holdings and the great seasonal variation in agricultural labor needs. Most agricultural holdings demand the full facilities of a family only at the time of harvest (if at all), and the rest of the year there is significant underemployment. Depending upon alternate opportunities to individuals, there may also be significant time periods during the year in which gross unemployment occurs at the village level. These are relatively great needs for absorbing the unemployment and the underemployment in agriculture. It is apparent, however, that this cannot be done effectively by expansion of industrial activity. If the total work force in non-agricultural pursuits in Pakistan were to be doubled, within the second five year plan period, this would remove less than 5 percent of the total under-and unemployed labor force in agriculture.

Increased attention might therefore be given by government to the possible role of such activities as labor battalions or work groups recruited from agricultural communities. Group efforts could be channeled into productive pursuits in rural areas, such as road building, school building construction, irrigation canal construction, drainage canal construction, and other activities that would be labor-intensive and siphon off some of the underemployment and unemployment in agriculture. This would stimulate more efficient use of the available human resource in agriculture. The contribution could be obtained at relatively low cost, particularly if such sources of funds as the Public Law 480 off-set funds were utilized. Improvement, at relatively low cost, of necessary infrastructures desired for total economic growth could thereby be

accomplished rapidly and efficiently.

Random Variables and a Few Omissions

The breadth of issues already raised in this discussion has been considerable. Questions of world politics, with the current east-west struggle, give every planner in developing countries cause for concern and worry. But it is beyond the scope of this paper to try to identify and analyze the basic concern with the alliance of nations and ideologies.[19]

It is too soon to evaluate either the scope or attainments of comprehensive land reform programs recently instituted by Pakistan.[20] The at times overlapping, at times competitive, and at times supplementary aspects of the Village-AID program and the National Development Organization-Basic Democracies programs are too broad and involved for discussion here.[21] Except as these programs directly and vitally concerned a specific element they were not herein considered at length.

Certain policy and institutional difficulties that have resulted from the physical partition of former colonial India into two separate nations of Pakistan and India were likewise minimized in this discussion. For example, many conferences between Pakistan and India were necessary in order to begin undertaking resolution of the Indus River water dispute. Leadership from various international groups and organizations has been required to bring the two nations into an agreement plan that will help settle their differences. This type of situation is of concern to the planner in programming economic growth in a nation much as Pakistan but was outside the focus of this paper.

The role and impact of foreign aid programs has also been largely eliminated by assumption. It is of basic necessity, however, to consider how, when, and by whom particular foreign aid programs can be generated to be of assistance in accelerating a nation's

continuity of foreign support as an aid basis is of fundamental concern in the planning activity. Stability in the source of foreign aid is a vital necessity in providing for long-run planning on a national basis. The nature of foreign aid programs, their attempts to concentrate within a sphere such as agriculture, or their attempts to provide nationwide coverage on too thin a basis, are also of concern. Such factors can either impede or accelerate the progress of planning activity and the planning function. The coordination of foreign aid programs with the national effort must be attempted at all times by government and its planning agency.

This is not to say, however, that the responsibility is all on the foreign aid providers' shoulders. The nation itself must attempt to provide sound and well-coordinated development programs and schemes that have firm and sound financial bases and probabilities of payout. Such programs must be analyzed in sufficient depth that the aid-giving agencies can evaluate the program on its own merit and also on the basis of its relation to the total goals of the nation. Recent reorganization of the planning units of Pakistan is expected to improve this function of the planning agent.

Reflections of an Outsider

Effective planning for accelerated agricultural development can be attained more easily if the suggestions made above for eliminating the major barriers are adopted in developing countries. The author is not uniquely identified with this position-the problems persist even though many advisors in many lands for many years have made similar suggestions. Provide firm but flexible over-all plans, eliminate compartmentalization of function, improve coordination and communication between the various government and private agencies concerned with agricultural development, provide a properly constituted organization staffed with an adequately trained and paid personnel who have the necessary responsibility and authority to

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implement development projects, strengthen the credit, marketing, extension, and other services provided to agriculture, and above all, have the administrative arm of government properly tuned in to the characteristics of agricultural development problems. But the need is for government or the planning agent or agency in developing countries to give more serious attention to the removal of these barriers.

One of the basic difficulties and perhaps one of the most significant ones stressed in this discussion of planning for agricultural development has been the failure of the nation to adhere to the discipline of the plan that attempts to formalize and channel accelerated economic growth. Such self-discipline is important not only to government officially, but also to the individual personnel who constitute the total government being. Unless the individual government servants are convinced and convicted of the wisdom of planning and the merit of official programs-then the plan will be nothing but a publication that can be used to impress visitors rather than a guide for accelerating economic growth.

A part of this self-discipline is the coordination of the finance departments, the implementation agencies, the inspection agencies, and the planning agencies, in a manner such that the total dimension of the plan is firm and is followed in the economic development programs of the nation building departments. The plan is a guide-a guide to be followed. As a guide, it must be reasonably firm and precise. The document, however, cannot be and should not be an inflexible form which serves as a restrictive strait jacket. Plans are made on the basis of current information. As the setting and character of the problems change, as the attainments of earlier growth and development projects come to fruition, as the

It must provide firmness, strength, and stability. It must provide rigidity and basic cohesiveness to present a coordinated and well-rounded development program. But it must likewise allow for change, variation, and periodic revision as growth and development are accomplished within the nation's economy.

The major theme of this paper has been to identify major barriers encountered on a localized level when actively engaged in planning for accelerated agricultural growth in a developing country, and to suggest actions that can be taken to eliminate or at least smooth out the impact of these barriers.

F O O T N O T E S

1. Government interest in improving administrative structure has taken the form of study commissions at both the central and provincial levels. Some recommendations for improving operations have already been adopted, and others are the object of further study.

2. Note this viewpoint is intended to be provincial but not parochial. Furthermore, the author is most familiar with the planning process as practiced at the provincial level of West Pakistan. It will become clear, however, that commentary and analysis are not restricted to this single level of government activity.

3. Recent implementation of many of the recommendations of the Credit Inquiries Commission are expected to make significant inroads on the difficulties encountered in agricultural finance and credit.

4. Government of Pakistan, National Planning Board, The First Five Year Plan, 1955-60 (Karachi: Government of Pakistan Press, 1958), p. 652; Planning Commission, The Second Five Year Plan, 1960-65 (Karachi: Government of Pakistan Press, 1960), p. 416.

5. Government of Pakistan, Planning Commission, The First Five Year Plan Preliminary Evaluation Report (Karachi: Government of Pakistan Press, 1959), p. 47. The Second Five Year Plan, op cit., pp. 1-3.

6. For example, the Pakistan Advisory Project of Harvard University, sponsored by the Ford Foundation, has averaged about 10 advisors per year plus associated consultants, training, research recruitment, and administrative services. This has cost about $ 500,000 per year for the advisory group alone-without consideration of the rather expensive operations of the Planning Commission and the Planning and Development Departments of Pakistan or assistance from foreign governments. See Gustav F. Papanek, "A Plan for Planning: The Need for a Better Method of Assisting Underdeveloped Countries on Their Economic Policies," Occasional Papers in International Affairs No.1 (Cambridge: Harvard University Center for International Affairs, July 1961), p.12.

7. Located in the desert area between the Indus and Jhelum Rivers, over 2,000,000 acres is to be brought under irrigated cultivation and over 1,000 new villages established, together with all necessary agricultural and non-agricultural services.

8. Even more hopeful are the general and specific recommendations for unified administration contained in Government of Pakistan, Ministry of Food and Agriculture, Report of the Food and Agriculture Commission (Karachi; Manager of Publications, February 1961), p. 582.

9. Ibid, presents a thorough analysis of the merits of agricultural development corporations and recommends establishment of one such agency in each province of Pakistan.

10. Recent redefinition of the Planning Commission's functions to improve intersector coordination and coordination between planning and implementation units is expected to result in significant improvement in intra-government communication. Dawn (Karachi), August 23, 1961.

11. This has long been a contention of the amicus agriculturae, but has not been fully substantiable. The Report of the Food and Agriculture Commission, op cit., pp. 578-82, provides sound documentation.

12. Government of Pakistan, Credit Inquiry Commission Report (Karachi: Government of Pakistan Press, 1960), p. 218.

13. Cf. also Report of the Food and Agriculture Commission, op cit.

14. Fertility trials in both East and West Pakistan have produced spectacular results, frequently a very profitable two-fold increase in production. It must be remembered, however, that such trials are run under most favorable conditions. Results at the field level have been much more modest.

15. This attitude has been strengthened by the Report of the Food and Agriculture Commission, op cit., in which clear distinction is made between long-run or basic and short-run or limited programs to increase over-all agricultural production.

16. The recent reorganization of the Planning Commission (cf. footnote 10) is aimed, in part at least, at correcting this type of problem, so characteristic of a developing country.

17. A word of caution should perhaps be introduced at this point: one of the potentially greatest dangers facing an underdeveloped country is the creation of a large mass of semi-educated or educated unemployed. Government and its planners must have productive employment waiting for its people at the time they become available from its schools, colleges, and training institutions.

18. The author is indebted to John C. Eddison, colleague and fellow advisor in West Pakistan, for the introduction to this analogy.

19. The personal objectivity of the individual planner or the advisor who serves as an agent of government in the planning process is also a crucial item in terms of providing for smooth roads to progress in the development of a nation. For an interesting discussion of possible means to improve the role of planning and planners in underdeveloped countries, see Papanek, op.cit.

20. For example, the Land Commission of West Pakistan was appointed shortly after the beginning of President Ayub's regime in October 1958. The Report of the Land Reforms Commission for West Pakistan was transmitted

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21. Some indication of the integration desirable between these programs can be gained from Government of Pakistan, Ministry of Health and Social Welfare, Basic Democracy: NDO-BD Integration (Karachi: Government of Pakistan Press, 1960). p. 62.

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SEMINAR

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AGRICULTURAL ADMINISTRATION
(March 9 - 12, 1966)

AGRICULTURE IN JAPAN

INDIAN SCHOOL OF PUBLIC ADMINISTRATION
Indraprastha Estate,
Ring Road,
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AGRICULTURE IN JAPAN*

The development of modern agricultural in Japan started almost one hundred years back, since the Meiji Restoration in 1868. Three broad phases can be distinguished in the growth process:

i. a period of rapid growth beginning from the period of restoration until the World War I;

ii. a period of slower growth and retardation during the two World Wars and the inter-war period; and

iii. a renewed period of rapid growth starting after the end of World War II and continuing to the present time.

The major characteristics of these three phases are described below:

(i) 1868-1914: Agriculture developed extremely rapidly during these years. The annual rate of growth of agriculture averaged almost 2.3 per cent, and the expansion rate of food crops was high enough to outstrip the growth rate of population. Land productivity nearly doubled, labour productivity more than doubled, while the absolute number of people engaged in agriculture remained more or less constant. During this initial phase agriculture and other non-agricultural sectors developed in harmony. Demand and supply of food grew more or less in equilibrium. But this is not all. Notice must also be taken of great increase in the export of agricultural products during the phase, especially tea and silk. The export earnings from these products provided the necessary foreign exchange to pay for the capital goods needed for Japanese industrilization. Furthermore, at this time, the central Government depended on agriculture, for most of its revenue, and public expenditures played a crucial role in modernizing the country.

* This paper summarizes the concluding part of a book entitled Agricultural Development in Modern Japan, edited by T. Ogura and published by Japan FAO Association, 1963.

Before the Meiji Restoration the fiscal structure of Japan was based on rice taxes paid in kind by the peasants to their feudal lords. In the early 1870's the new central Government instituted a new land tax essentially designed to lay its hands on the part of the agricultural product which had previously gone to the feudal rulers. The new tax was assessed in terms of money, and had to be paid by the landlords. This new land tax siphoned-off much of the surplus generated within agriculture, and was the principal source of revenue for the Government. Although the rate of tax remained at pre-Restoration levels, the new Government was bent on industrialization, and thus the 'surplus' was used productively. Moreover, agriculture in general was growing rapidly and the amount of potential 'surplus' was getting larger. The Government took more or less constant amount, allowing the land owners to accumulate more capital, which eventually found their way into modern industries.

The principal elements making for progress in Japanese agriculture took two forms: technical and institutional. On the technical side one must notice the key improvements were in keeping with the small unit of production in Japanese agriculture. Two aspects of technical improvements might be mentioned, land improvements including better irrigation and drainage facilities and some land reclamation, and still more, improvements in input of manures and fertilizers. The second type of improvement involved some increases in working capital, but only very small increases in fixed capital, and was therefore very much in keeping with Japan's factor endowments: cheap labour and scarce capital. The technical advances during the period - the so called "Meiji Technology"

- in reality became a combination of indigenous know-how and very selective borrowing from the West.

On the institutional side, the Meiji Restoration brought to power a central Government dedicated to modern economic growth. This Government unified the country for the domestic market and increased demand. The new Government also improved communications and abolished inter-domain barriers. The process was furthered by an extensive education programme, extension services, and the like. It was also helped by the further development and improvement of indigenous agricultural methods. The Government was active in all of these areas. Agriculture was also fortunate in possessing an active and forward looking entrepreneurial class - the owner-cultivators. At the time of Restoration the peasantry was given the land on an ownership basis and most of them became owner-cultivators. In so far as they had tenants, they were interested in raising and stabilizing yields, since the land tax was a fixed amount. These desires were further intensified because of continual increase in the price of rice. Mention should also be made of the existence among the land-owners of a significant number of educated "middle class", who lived on the land and worked side-by-side with smaller owners and tenants.

(ii) <u>1914-45</u>: The rate of growth of Japanese agriculture began to decline at about the time of World War I. The implications of this decline were serious: food shortages led to a more intensive development of rice production in Korea and Taiwan. The relative position of agriculture <u>vis-a-vis</u> the rest of the economy worsened, so much so that it now became a depressed area seeking support.

The reasons for this retardation are necessarily complex. On the exogenous side, the inter-war period was

generally difficult. Agricultural prices began to decline from the twenties, reaching its lowest point during the early thirties - along with the great depression. The import policy of the Government also affected the farmers adversely.

However, there were more 'fundamental' factors responsible for this state of affairs. Japan probably reached at about the time of the World War I, deminishing returns in agriculture. Further, improvement required 'lumpy' investments, and these were out of reach of the small cultivator. Intensive application of fertilizers led initially to soil deficiencies. Moreover, the number of people on the land could not be reduced because of the limited absorptive power of the secondary and tetiory sectors. Absentee landlordism was becoming common, while imports of rice from Korea and Taiwan kept the Japanese farmer under great pressure.

Possible solutions might have been larger units, mechanization, and different techniques. Most of these were out of the question: economically, technically and institutionally.

(iii) <u>1945 - to the Present</u>: After World War II, Japanese agriculture realized another growth spurt. The major influences can be outlined without difficulty. Firstly, the land reform initiated by the U.S. occupation was extremely important. This measure greatly reduced the number of tenants and virtually eliminated absentee ownership. The economic incentives of the farmer tenants were greatly increased.

Secondly, the dissolution of the Empire abolished colonial competition from Korea and Taiwan. Food imports were also limited by the world food shortage and by foreign

exchange considerations. Government price controls also gradually changed to price supports to stimulate production. Thirdly, until 1953, the terms of trade shifted very much in favour of agriculture and the farmers for a few years were able to accumulate sizeable funds. The post-war inflation also helped them to liquidate their debts.

Fourthly, post-war years saw a much more active government land reclamation and improvement programme through 'lumpy' investments, which the individual farmer could not handle. Fifthly, account must also be taken of the post-war advances in technology which were greatly facilitated by developments in the non-agricultural sector of the economy. Many of these were advantageously used by the farmer. There has been considerable diversification in Japanese agriculture in the post-war period.

It is, however, well to bear in mind that agricultural development may, once again, come to halt unless the unfavourable man-land ratio and the small-scale of cultivation is changed. At the present time, perhaps for the first time in Japanese history, the absolute numbers in agriculture have started to decline rapidly. This may well be the most important development of all.

Agrichlture and Economic Development

In this Section we confine ourselves to a discussion of the role of the external factors in stimulating the development of Japanese agriculture and of the interrelationships between the agricultural and other sectors of the economy. First of all, the increased demand for agricultural goods associated with general economic

of agriculture in Japan, particularly noteworthy being the movement of population to the urban areas and the "monetary demand" for food that was created. The resulting development of a money-economy went far to undermine the older order and made the rural economy more responsive to the influence of modern development. Rising incomes also brought about changes in food habits of the population, and consequently the pattern of Japanese agriculture underwent a change with an emphasis on quality food stuffs.

The second major stimulant to agriculture was provided by technological factors. The most important aspects of the reciprocity between agriculture and other sectors of the economy related to demand factors. Agricultural expansion resulted in a rising demand for the products of industry and other sectors, especially certain branches of the chemical and engineering industries. On the other hand, the provision of social and economic overheads - transportation, communications, roads, education - also contributed in a significant way in widening the market for agricultural products. On the supply side, there was a significant migration of labour from the rural areas to the urban or from agriculture to industry. The existence of economic and social overheads also facilitated the supply of products from agriculture to industry and vice versa.

The third contribution of agriculture to the rest of the economy in Japan, was her agricultural exports, and judicious utilization of the foreign exchange earnings towards the import of capital equipment and raw materials. Exports of tea and silk - both products of the agricultural sector - played a crucial part in Japan's foreign trade. The fourth contribution of agriculture to general economic development in Japan was that it also provided savings or

financial resources for the process of capital formation itself. What enabled the Japanese agriculture to fulfil this role was essentially the improvement in agricultural productivity itself - and hence of agricultural incomes - and the specific mechanism which prevailed to channel into investment a substantial part of the increment to output. This role of agriculture has, of course, been progressively modified in Japan during the later phases of industrialization - more particularly after the World War II.

Significant Aspects of Japanese Agriculture

The outstanding success of Japanese agricultural development must be quite largely ascribed to the flexibility and thoroughness with which its policies and measures have been applied. For example the agricultural cooperatives were substantially improved by a whole series of acts which ensured cooperative facilities for credit marketing and purchasing were available to all farmers, even in remote hamlets, and these facilities were closely related to the needs of farmers at the time. The same is true of price-stablization measures. The original legislation of 1920 was constantly modified or replaced by new acts in order to plug loopholes in the system and to adapt policy to changing circumstances. Above all, care was taken to implement price-stablization measures so effectively that consumers could count on buying at the prescribed maximum price and farmers could count on receiving the assured minimum price.

Similarly, while agricultural research, education and extension method in Japan were not essentially different from those used elsewhere, they were carried through with a realism and intensity which make them almost unique. Agricultural research was vigorously directed towards the felt

needs of farmers or the requirements of policy. The extension services were staffed on a scale which made advice on farm management readily available to all farmers. Agricultural cooperatives were encouraged to provide farm advisory services, for which small charges were made. Methods were developed through farm meetings and other means for the exchange of information between farmers.

Another valuable feature of Japanese agricultural administration has been the farm household survey, conducted regularly since 1921, and extended on a modern sample basis after the War. The survey collects detailed information on household and production expenditures, on receipts from farm sales, on credit and indebtedness, etc. With this and with a remarkably full supply of other statistical and economic information at his disposal the Japanese administrator is possibly better equipped to make informed policy decisions than his opposite numbers in most other countries in the world.

The paragraphs which follow comment on some of the more notable features of Japanese experience in such key sectors as agricultural research, education and extension, land tenure, land adjustment, price-stablization policies, farm credit and insurance, and agricultural cooperatives.

(i) <u>Technological Factors:</u>

A significant feature of the increase in farm productivity and output in Japan is the extent to which it resulted from technological innovations. The capital investment associated with these technical improvements was modest and mainly took the form of requirements for working capital that gave a quick pay off in increased output. Moreover, these technological innovations were adapted to the existing framework of small farm units. It facilitated full and

productive utilization of the large farm labour force, and it led to substantial increases in yields per acre rather than depending mainly upon increasing the area under cultivation.

The special importance of inexpensive technological innovations is indicated clearly by a comparison of the increase in agricultural output that was achieved with the increase in physical inputs such as cultivated land, labour and fixed and working capital. Outlays for fertilizer increased rapidly but high returns were obtained from the combined effect of heavier application of fertilizers, use of improved seed and better farm practices. Until recent years the expansion of farm output was achieved with only a modest increase in the use of purchased inputs. Especially significant is the fact that the requirements for capital funds, other than working capital for fertilizers, were very modest indeed. During the past decade, however, investment in farm machinery and other types of farm equipment has become significant, as would be expected since the farm labour force has for the first time begun to decline in absolute numbers and agriculture is no longer characterized by an abundance of labour. Over the whole period, the introduction of improved varieties, and increasingly heavy use of fertilizers stand out as the factors contributing most to higher yields and increased productivity. Again, the selection and breeding work was aimed chiefly at developing varieties characterized by a strong response to increased application of fertilizers.

The Government's initial approach to increasing the efficiency of Japanese agriculture was, however, based upon an indiscriminate importation of "western" methods of large-scale farming. The methods had very little impact on Japanese agriculture, and the Government, therefore, adopted a new

policy aimed at increasing the efficiency of the prevailing small-scale farming. After abandoning the uncritical imitation of foreign techniques, the Government concentrated its effort on the task of evolving an agricultural technology specifically adopted to the physical and economic characteristic of Japanese agriculture. A good deal of technical progress had taken place during the feudal Tokugawa period, but this tended to take the form of isolated achievements that had only limited impact on the country's agricultural output and average productivity. But with the break-up of feudal restrictions on the movement of goods and people and the creation of a national economy, knowledge of improved methods practiced by progressive farmers came to be spread much more widely.

The establishment of agricultural colleges and other training institutions during this period provided the basis for technological progress in a later phase when the development and dissemination of improved production possibilities relied very heavily upon the work of the Government experiment stations and upon Government-supported extension activities. In the initial period, however, improved plant varieties selective by individual farmers were a decisive factor. The Government's agricultural research stations and research work at the universities began to make highly significant contributions to increasing the productivity of Japanese agriculture in the late 19th century. The research workers in Japan gave major attention to rice, as the country's dominant crop, and concerned themselves with all aspects of rice cultivation - plowing and preparation of of paddy fields, techniques for raising seedlings in nursery beds, the density and method of planting, fertilizer application, introduction of green manuring, water control, weeding pest and disease control and harvesting.

Research and technological innovations, seemed to have played an even more striking role with respect to the spectacular increases in output and productivity in silk production. The influence of technological advance in silk production is suggested by the fact that the eight-fold increase in cocoon production between 1880 to 1930 was associated with a seventeen-fold increase in output of raw silk. The close ties between agricultural research and everday farming operations were reinforced by the responsibilities for extension assumed by the prefectural experiment stations. While the central Government emphasized basic research and work on problems of national significance, the prefectural stations concentrated their efforts on applied research, relating to local problems which held promise of giving results of immediate, practical importance.

The most important technical interaction between agriculture and industry during the inter-war period was the creation of a domestic fertilizer industry. Rapid growth of output of chemical fertilizers provided a more elastic and cheaper supply of fertilizers. The use of covered nursery beds for rice seedlings was also introduced to permit earlier planting and harvest and thus escape damage from cold weather. The introduction of early, medium and late-maturing varieties of rice also greatly increased and flexibility of rice cultivation alleviated the acute labour bottleneck at transplanting time. Japanese agriculture has also benefitted greatly from the increased effectiveness of disease and pest control measures resulting from the development of DDT, BHC and other chemical products. Widespread use of power-driven sprayers and dusters also contributed to more effective disease and pest control.

During the inter-war period there was a considerable increase in use of electric motors and internal combustion

engines for threshing, pumping irrigation water and other anxiliary operations. This practice has expanded since World War II. Much more striking has been the rapid increase in the mechanization of plowing and other field operations after the World War II, so much so that by 1960. there was an eight-fold increase of small tractors in use over 1950 totlling about half a million. At the moment something like 50 per cent of the cultivated area is now plowed, with mechanical equipment.

A great many factors have influenced the widespread adoption of improved technology by Japan's farmers. Initially local meetings were organized for the exchange of promising varieties of seed and the example and advice provided by outstanding "veteran farmers" seem to have been the major influence. Government officials at the national, prefectural, and local levels regarded agricultural production as a matter of great importance and supported the activities of research and extension personnel in many ways. The rapid expansion of general and technical education also must have contributed a good deal to the success of measures to increase farm productivity. In Japan, as elsewhere, it would appear that education not only imparted knowledge and skills useful in agriculture, but also tended to enhance the capacity of farmers to recognize opportunities and their receptiveness to innovations.

(ii) Land Tenure:

In the Tokugawa period, the peasants were bound to the land they cultivated. After the Restoration, all land was made freely cultivable and transferable, and land titles were issued to all occupants affirming their private ownership. However, having done this, the matter was left to the mercy of an unrestrained operation of the money economy.

The burden of the land tax, the need to pay it in cash, the unrestricted rights of alienation granted, and the concept of freedom of contract, all combined to create conditions which forced many a small farmers to sell his land and accept tenancy under a landowner. The process was accelerated by the inflationary conditions during 1879-81. After the stabilization of currency in 1885, there followed a period of prosperity which was further strengthened by the outbreak of the Sino-Japanese War in 1894 and the Russo-Japanese war in 1905, and the consequent improvement in agricultural prices. With rising prices, it was again profitable to rent lands in kind and to pay the land tax in cash, and tenancy continued to expand. This period, from 1872 to 1908, is of the greatest interest in the history of Japanese agricultural development, for in it great agricultural progress was achieved within the traditional frame-work of small-scale cultivation and under a land tenure which had grown merely out of the operation of a <u>leissez-faire</u> economy.

In the inter-war period with economic depression falling commodity prices and a fixed land tax, the leasing out of land became much less profitable. At the same time, labour and farmer movements were growing in strength and there began to occur all over the country disputes between landlords and tenants, the latter asking for reduction of rents. The only instrument governing the relations between the landlord and tenant at the time was the Civil Code which was enacted in 1895 and which only codified the then existing practices. The demand of the tenants was a Tenancy Law which would give them security to tenure and right to form unions or associations for collective bargaining. A number of laws regulating conditions of tenancy were defeated in the Diet in which landowners were influential. However, in 1938, a Farmland Adjustment

Bill was passed which legally recognised a tenant in effective possession of land, and gave them some security of tenure.

Another line of attack on the tenancy problem during the inter-war period was the policy of promoting owner-farmers whereby the price of tenant cultivated land was fixed at about 16 times the value of the rent the tenant paid in kind. This was further facilitated by an enactment in 1937 for assistance in the creation and maintenance of owner-farmers. The weakness of commodity prices during the inter-war years was a main fact in undermining the position of landlords. War-time control of price further weakened their position. Thus the position of landlords as a class had already been greatly weakened when the "democratization" of the rural areas was carried through during the occupation when post-war land reform was undertaken.

At the end of World War II, the Japanese Government proposed an amendment to the Farmland Adjustment Law which envisaged that land leased out by the absentee landlords and by the resident landlords in excess of 5 hectacres should be surrendered to the tenants at their request; that rents in kind should be abolished and replaced by cash rents and that the tenancy contracts should not be terminated without the approval of Farmland Committees at the village level. However, the occupation authorities recommended a more radical reform. Accordingly, in September 1946, a revised amendment to the Farmland Adjustment Law and a Special Bill on Establishment of Owner-farmers were proposed and approved. Under this law, all farmland owned by absentee landlords and by resident landlords in excess of one hectacre (four hectacres in Hokkaido) was brought by the Government and was distributed within two years of the coming into force of the statute. The purchase price of lands was fixed at

a sum obtained by multiplying the rent and the reciprocal of the interest rate on Government bonds.

The Land Reform was started in 1947 and completed in 1949. The landlords resisted the execution of the reform by various devices, but because of the presence of the occupation authority, these devices failed and about 2 million hectares of farmland, amounting to nearly 80 per cent of the tenant cultivated land, was transferred to the tenants. The land reform was finalized in 1950. In 1952, the Agriculture Land Law enacted to take over the functions of the Farmland Adjustment Law and the Owner-farmer Establishment Special Measures Law under which the reform had been carried out.

About 15 years have passed since the post-war land reform in Japan. Meanwhile, the economy has developed greatly and many persons have migrated to industrial centres, so that there is often a shortage of manpower at busy periods. In the circumstances, it seems that the present system of land tenure may become an obstacle to the further development of agriculture unless the ceiling on the size of holdings is raised, or some other means found to make larger scale operation possible.

(iii) Agricultural Price Stabilzation:

The use of price stablization techniques as a means of stimulating production came late in the history of Japanese agricultural development, mainly after World War II. Systematic price stablization measure were first introduced in Japan, not in conditions of shortage but of surplus and falling prices. Three distinct phases may be distinguished in Japanese price policies:

(a) Systematic price stablization measures were introduced soon after the collapse of prices

in 1920 following the end of the war-time boom. From then until the mid-thirties they were designed primarily to maintain prices and to alleviate rural distress and unrest in a period of over-supply, largely because of rising imports from the colonies. At this time price supports probably benefited land-owners, as the largest sellers, more than tenant cultivators.

(b) With the beginning of war conditions in the late thirties, coupled with reduced imports from Korea, the surplus situation changed in a few years to one of shortage. From 1939 until the mid-fifties, the twin aims of price policies were to contain consumer prices and to stimulate production.

(c) Since the end of the period of shortage around 1955, domestic farm prices in Japan have been maintained above the cost of imports, mainly as a means of reducing disparities between farm incomes and those in other occupations, though they still act also as production incentives.

The above comments have been largely confined to the marketing of grain, although Japan also stablizes prices of a fairly wide range of products of domestic consumption, including potatoes, rapeseed, soyabeans, and sugar. For these commodities, too, reliance is placed on Government purchases and sales, though on a more limited scale than for rice. In 1961, an Animal Products Price Stablization Law was enacted providing for minimum and maximum prices for diary products, meat, and eggs in order to control price fluctuations and to encourage production to meet the growing demand. Price stablization is also practiced for raw silk and cocoons for which maximum and minimum prices are fixed

by Government. For this product, however, which enters largely into export markets, Japanese experience has not been too fortunate because of virtual impossibility of regulating supplies on export markets, and because of growing competition from synthetic fibres.

(iv) Cooperative Organizations:

The Agricultural Cooperative Association was established in Japan under a Law of 1900 which authorised cooperatives for credit, marketing and purchasing. The law stipulated that cooperatives concerned with credit could not engage in the other types of business, but this restriction was removed in 1906, since then the main emphasis in Japan has been on general purpose cooperatives.

Later legislation provided for setting up prefectural and national cooperative federations (1909), gave Government backing to cooperative capital (1907), and permitted cooperatives to provide ware-housing services for farmers (1919). Other important steps were the establishment of a National Purchasing Federation and of a Central Bank for Cooperative Association in 1923. Agricultural cooperation developed quickly under these conditions.

During the early inter-war period credit accounted for a larger share of cooperative activity, than marketing or purchasing. Even so, cooperatives became well established in some directions, thus by 1920 they handled more than half the sales of silk cocoons and undertook substantial purchases of fertilizer. Later they became entrenched in grain distribution and ware-housing. Their role as credit agencies was further enhanced by bankruptcies of local private banks during the depression of the thirties and by their use in chanelling Government subsidies to farmers.

After the official war-time agricultural associations had been dissolved, the Agricultural Cooperatives were re-established under a law of 1947. In general, the village cooperatives were of a general purpose type, though separate prefectural and national associations were set up for marketing, and credit. Side by side with the general purpose cooperatives, however, there has been a rapid development of specialized cooperatives, which usually deal with some service not handled adequately or not handled at all by general purpose cooperatives. The largest number were concerned with silk culture, followed in order of importance by livestock marketing, fruit and vegetable marketing, and cottage industries. Land reclamation cooperatives are another rather distinct type encouraged since the war.

Cooperatives in Japan were initiated by Government action and developed by active Government encouragement. They have became the agents of the administration for carrying out certain policy measures, notably price stablization. It could fairly be claimed that they differ considerably from the original conception of cooperatives. Nevertheless, they still enjoy, at the more centralised and at the village level, a large degree of control over their own affairs, though subject to official audit. There can be no doubt that they have contributed immensely both to the welfare of farmers and to the progress of agricultural development.

(v) Crop and Live-stock Insurance:

Japan is one of the very few countries operating a comprehensive system of crop and live-stock insurance. Japan found it practicable to establish livestock insurance primarily for draught animals in 1939, more than 10 years before crop insurance was adopted. Live-stock insurance was

voluntary, but any farmer participating had to insure all his horses and oxen. Half the insurance was reinsured by the association concerned with the Government. Crop insurance, introduced in 1938, reflected both the development of price stabilization and the decline of the landlord system. Crop insurance is effected through a net work of insurance associations established on a county or city basis and combined into prefectural federations. The State bears part of the insurance premia, and compensation is paid to farmers when yields fall by more than 30 per cent, below the normal for the district.

Crop insurance can undoubtedly contribute greatly to rural welfare, though it has given rise to some dissatisfaction in Japan - farmers in districts with low weather risks have the impression that they subsidize their fellow farmers in more vulnerable areas. How important crops insurance can be as an incentive to increased production is less clear; it may well be that farmers embark more readily on substantial/against weather risks, and there may be other incentive effects. It should be borne in mind, however, that crop insurance puts a considerable burden on Government finance.

Conclusion

It is true that initial conditions in 19th century Japan resemble in many ways those found in many developing countries, and that in these countries economic development is likely to follow the Japanese rather than the Western pattern. Nevertheless, each country has its own circumstances and its own problems which must largely determine the course it follows. In this concluding section we would underline few aspects of Japanese agricultural development which are of general significance.

/ expenditures for fertilizers and other inputs of the

One notable feature of Japanese development was the very close inter-relations between agriculture and the rest of the economy. In the early stages Japanese development was built on an agricultural base. Above all, agriculture provided most of the resources needed both for Government and for investment in industry. At the same time, investment in agriculture was not regulated though in the main agricultural development was achieved by labour-intensive methods requiring relatively little fixed capital. In addition agricultural exports provided most of the foreign exchange needed for development. Again the agricultural sector provided the main market for Japan's infant industries.

On the other hand, agriculture's debt to industry was no less crucial. The rising urban demand on agricultural produce and the demand of the industry for excess labour from the rural sector, both helped to raise agricultural output and productivity. Again, as Japanese industry developed, it was able to provide improved agricultural inputs like fertilizers, pesticides, farm machinery and other requisits of an advanced agriculture. Technological innovations often found application in agriculture. This close integration between the two main sectors of the economy is particularly noteworthy.

A second feature of Japanese experience is that it underlines the enormous potential for growth latent in the agriculture of developing countries within the framework of small farms. It is noteworthy that the first advances in productivity came not by importing knowledge from abroad, but by studying and propagating the methods of her own best farmers, and by selecting the best indigenous varieties of the main crops. Full account was taken

not only of ecological conditions, but also of economic and social conditions of Japan. Methods of raising farm output were evolved which required relatively little investment of fixed capital, but which made full use of the abundant labour resources with the help of considerable injections of short-term working capital.

A third noteworthy aspect was the attention paid to organization and the exceptional thoroughness with which policies were carried out and effectively implemented by a strong central Government intent on modernization. The organization and systematic pursuit of agricultural research is in itself an excellent example. But it was matched by no less systematic organization of an extension service closely linked with the experiment stations to disseminate their research results. This service was staffed on the scale necessary to carry through the immense task of making readily available the findings of agricultural research to millions of scattered farmers. Extension work is greatly aided by the high level of literacy, even in rural areas.

Fourthly, the organization of economic services to farmers was no less impressive. The development of cooperatives helped the small working farmers in marketing their produce advantageously or in obtaining resources to improve or extend their operations. Organized primarily as general purpose cooperatives, and extending their network to the remotest hamlet, the cooperative associations make adequate credit, marketing, and purchasing facilities available to virtually every farmer. They provide him with funds to buy production requisites or to adopt new practices; they supply these on favourable terms and help the smallest farmer to realise the full market price for his product.

Finally, they effectively channel price supports, production subsidies, and other incentives to the farmers themselves. The present strength of Japanese agricultural cooperatives owes much to their use by the Government as agencies for purchasing, ware-housing etc. HL 1CA

The fifth factor of importance is the system of land tenure in Japan carried out by the two major land reforms. The first, about 1870, was designed primarily to replace feudal dues by a central land tax, but established also an enterprising class of small landowners, frequently cultivating their own land. The second land reform, after World War II, again restored the land to the actual cultivators.

The Japanese experience suggests that progress is possible even when conditions are less than optimum, given a strong government land, a flexible and practical rather than a doctrinaire approach, and perhaps also on the part of farmers and officials, a certain pride in a job well done.

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