Workshop

on

"Environment and Cooperatives"

July 26-31, 1993

VSMishra

SUBJECT PAPERS

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8 x 2 = 162 Papers

Venue :

Jawaharlal Nehru Cooperative Complex (NCUI Building),
3, Siri Institutional Area, Khel Gaon Marg,
New Delhi-110016

NCCF □ IFFCO □ ICA-ROAP

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NCCE • IFFCO • ICA-ROAP

NATIONAL CENTRE FOR COOPERATIVE EDUCATION

(National Cooperative Union of India)

Workshop on

"Environment and Cooperatives"

Workshop Director	-	Shri B.D. Sharma Chief Executive-NCUI
Co-Director	-	Mrs. Indra Gupta Principal-NCCE
Workshop Incharge	-	Shri V.S. Misra Dy. Director-NCCE
Resource Persons	-	Dr. Daman Prakash Project Director-ICA-ROAP
	-	Dr. G.C. Shrotriya Manager (AS)-IFFCO
Experts Associated	-	Miss V. Mitra Adviser-ILO
	-	Dr. Vijayalakshmi Managing Director & Consultant-CCA
	-	Shri Suresh Chandra Director-Central Water Commission
	-	Dr. G.D. Sootha Adviser, Ministry of Non-Conventional Energy Sources, Government of India
	-	Dr. J.S. Gill NCERT, New Delhi
	-	Miss Uma Mukherjee Gender Adviser-ICA-ROAP
	-	Mrs. S.K. Nagratna Rao LCEO, Karnataka State Coop. Union
	-	Shri Sharad Kant Director-NCUI

NATIONAL CENTRE FOR COOPERATIVE EDUCATION
(National Cooperative Union of India)

Workshop on
"Environment and Cooperatives"

Objective	:	- To acquaint the participants about the present status of environment management. - To examine the issue and steps involved in designing environment friendly pattern of rural development. - To develop methods and techniques for creating awareness among cooperative members and community about deteriorating condition of environment.
duration	:	One week
Dates	:	26th to 31st July. 1993
Venue	:	Jawaharlal Nehru Cooperative Complex (NCUI Building). 3 Siri Institutional Area. Khel Gaon Marg. New Delhi-110016.
Participants	:	- FGl and lady Mobilisers of NCUI Field Projects. - Education Officer/CEIs/Lady CEIs of State Cooperative Unions.
Collaborating Organisations	:	- National Centre for Cooperative Education (NCCE). New Delhi. - ICA Regional Office for Asia and the Pacific. New Delhi. - Indian Farmers Fertiliser Cooperatives Ltd.. New Delhi.
Resource Persons	:	- Dr. Daman Prakash. Project Director. ICA. ROAP. New Delhi - Dr. G.C. Shrotriya. Manager. IFFCO. New Delhi
Workshop Incharge	:	- Shri V.S. Misra Dy. Director. NCCE

PROGRAMME

26th July, 1993

9.30 Hrs.	:	Registration
10.30 Hrs.	:	Inauguration
11.30 Hrs.	:	Tea
11.45 Hrs.	:	Environment and Sustainable Cooperative Development in Asia—An Overview - Dr. Daman Prakash Project Director, ICA-ROAP
13.00 Hrs.	:	Lunch
14.15 Hrs.	:	Environment Management in India - Policies and Programmes - Dr. G.C. Shrotriya Manager (AS), IFFCO - Shri V.S. Misra Dy. Director, NCCE
15.30 Hrs.	:	Tea
15.45 Hrs.	:	Promotion of better living through Cooperatives - Mrs. S.K. Nagaratna Rao Lady Coop. Education Officer, KSCU - Miss Uma Mukherjee Gender Adviser, ICA-ROAP

27th July, 1993

10.15 Hrs.	:	Population Explosion - Impact on Environment - Role of Cooperatives - Miss V. Mitra Adviser, ILO
11.30 Hrs.	:	Tea
11.45 Hrs.	:	Water Resources and Environment - Shri Suresh Chandra Director, Central Water Commission
13.00 Hrs.	:	Lunch
14.15 Hrs.	:	Natural Resources and Environment—Management of Land - Dr. G.C. Shrotriya Manager (AS), IFFCO
15.30 Hrs.	:	Tea
15.45 Hrs.	:	Exploiting Renewable Energy/Resources to meet the Energy Requirements of our Society. - Shri G.D. Sootha Adviser Ministry of Non-Conventional Energy Sources, Government of India

28th July, 1993

10.15 Hrs.	:	Recycling of Wastes Environmental Implications - Prof. (Dr.) J.S. Gill NCERT
11.30 Hrs.	:	Tea
11.45 Hrs.	:	People's participation in Environment Management - Dr. Vijayalakshmi Managing Director & Consultant. Canadian Coopertive Association
13.00 Hrs.	:	Lunch
14.15 Hrs.	:	Briefing and Discussion on "Action Plan for NCUI Project Area and Service Area of PACS - Dr. Daman Prakash. Project Director. ICA-ROAP - Dr. G.C. shrotriya. Manager (AS). IFFCO - Shri Sharad Kant. Director. NCUI - Smt. Indra Gupta. Principal. NCCE

29th July, 1993

10.15 Hrs. to 17.00 Hrs.	:	Preparation of Educational Material on Environment

30th July, 1993

10.15 Hrs. to 13.00 Hrs.	:	Preparation of Educational Material contd.
14.15 Hrs. to 17.00 Hrs.	:	Presentation of Material by participants

31st July, 1993

10.15 Hrs. to 17.00 Hrs.	:	Study visit - NAFED Processing Units

NATIONAL CENTRE FOR COOPERATIVE EDUCATION
(National Cooperative Union of India)

Workshop on "Environment and Cooperatives"

26th to 31st July, 1993

SUBJECT PAPERS

I. Environment and Sustainable Cooperative Development in Asia—An Overview

II. Environment Management in India—Policies and Programmes

III. Promotion of better living through Cooperatives

IV. Water Resources and Environment

V. Natural Resources and Environment—Management of Land

VI. Exploiting Renewable Energy/Resources to Meet the Energy Requirements of Our Society

VII. Recycling of Wastes Environmental Implications

VIII. People's Participation in Environment Management

ENVIRONMENT AND SUSTAINABLE COOPERATIVE DEVELOPMENT IN ASIA

- An Overview Paper

Daman Prakash
ICA Regional Advisor
(Development Planning)

INTERNATIONAL COOPERATIVE ALLIANCE
Regional Office for Asia and the Pacific
43 Friends Colony (East), New Delhi-110065. India.

Environment and Sustainable Cooperative Development in Asia

- An Overview Paper

CONTENTS

May 1992

"Development is dependent upon natural resources, as water is dependent upon its source. For development to be sustained, it is also necessary to continuously preserve the supporting natural resources. Consequently, sustainable development requires the continual support of an integrated natural resource base"..... "And this brings us to the question of the position of natural resources in the environmental system. Only by recognising that all components of the environment are interdependent, is it possible for natural resources to be sustained for the future? Take for instance the water that is needed for agricultural development. For agricultural development to be sustainable, it is important that the rainwater catchment area is maintained, and that the water-absorbing forests are preserved. In short, the water requirement for agricultural development, can only be met if the integral functions of the environmental system, encompassing forests, river basin areas, the climate and rainfall are preserved.... Therefore in order for development to be sustainable, it is necessary to have a sustained environmental system".

Dr. Emil Salim
Minister for Environment & Population
Republic of Indonesia

ENVIRONMENT AND SUSTAINABLE COOPERATIVE DEVELOPMENT IN ASIA - AN OVERVIEW PAPER

Daman Prakash
Regional Advisor (Development Planning)
ICA ROAP, New Delhi.

1. INTRODUCTION

1.1 Environment concerns all of us. It concerns our cooperatives too. And cooperatives are ours. Our environment and ecological balance is under a great stress now. We have to work together to "protect our environment so that our future generations are able to lead a wholesome and healthy life". The deteriorating condition of environment and ecology is engaging the attention of all human beings. National governments, non-governmental and international organisations have launched a number of projects thereby trying to protect environment. The matter was discussed at considerable length at the Central Committee of the International Cooperative Alliance (ICA) at its meeting held in Madrid in September 1990. The Committee adopted the following resolution in this context:

Environment and Development

"The Central Committee of the ICA at its meeting in Madrid in September 1990:

Deeply concerned by the critical state of the environment in which we live and the economic, social and political policies that perpetuate and further aggravate these conditions,

Noting that the major cause of the continuing deterioration of the global environment is the unsustainable pattern of production and consumption which has resulted in the depletion of the ozone layer, the greenhouse effect, the contamination of air and water, the degradation of land resources, etc.,

Recognizing the inter-related nature of development and environment necessities that environmental protection be viewed as an integral part of the development process and that economic policies be reviewed on issues including debt,

Recognizing also that unless action is taken in the immediate future at the local, national, regional and international level, human survival may be endangered,

Stress the need for education campaigns, conservation measures and policy changes in all sectors of the economy and at all levels to be made.

Urges ICA member-organisations to join in local, national, regional and international efforts to address the issues of environment and development and take measures to stop the degradation of the human and natural environment."

1.2 In its message issued in conjunction with the 68th International Cooperative Day (1990), the International Cooperative Alliance, a world confederation of Cooperative Movement, called on its 600 million individual members "to continue the battle to protect the environment, by supporting their societies' environmental campaigns and sustainable development programmes, lobbying local governments to adopt environment-friendly policies, boycotting products which are harmful to the environment, recycling reusable items and informing themselves and educating their children about nutrition and the environment."

Awareness Efforts

1.3 Being aware of the harmful effects to mankind through pollution and in accordance with the general policies laid down by the International Cooperative Alliance in this sector, the ICA Regional Office for Asia and the Pacific (ICA ROAP), New Delhi, undertook to develop and launch modest programmes for its member-organisations in the Region, by way of developing awareness materials. A small brochure A Place To Live written by Mr. Daman Prakash, issued by the ICA ROAP in November 1990, is an attempt in generating awareness among the cooperative populace and to create situations where all members of the cooperative world stand together to participate in this most important activity of our life-time i.e., protecting the environment. 3,000 copies of this awareness material have been distributed extensively. ICA member-organisations have been requested to give widest possible publicity to the material by reproducing it or by undertaking its translations. The material has already been translated into various languages e.g., Japanese, Hindi, Urdu, Bahasa Indonesia etc., and serialized in a number of cooperative journals throughout the Region.

ICA Regional Study

1.4 Already in this Region some positive steps have been taken by some Movements e.g., the Japanese Consumers' Cooperative Union, the Agricultural Cooperative Movement of Japan, various sectors of the Indian Cooperative Movement etc. During the year 1991-92, the ICA ROAP decided to undertake a comprehensive regional study leading to identification of causes of imbalances in eco-system and to collect and document more authentic and first-hand information from the field. The study is also aimed at developing suitable recommendations for the benefit of cooperative organisations in the Region.

1.5 In this connection the ICA ROAP had developed collaborative arrangements with some of its member-organisations to carry out the proposed study. Active cooperation and support is available from the Canadian Cooperatives Association (CCA), the Indian Farmers' Fertilizer Cooperative Limited (IFFCO-India), and the Cooperative Movement of Japan.

1.6 The ICA ROAP is also aware of the efforts made by the Canadian Cooperatives Association (CCA) in this sector. Of special significance

was the holding of a Regional Conference on "Environment and Sustainable Cooperative Development" in May 1990 in Chiang Mai, Thailand, which was also attended by a representative of the ICA ROAP. The Conference, besides suggesting long-term and short-term action plans, also issued a declaration, called the Chiang Mai Declaration, as reproduced below:

"We, the Cooperators of the Earth, who have gathered for a common cause, at the CCA Asia Regional Conference - Environment and Sustainable Cooperative Development - who believe the time for concern and action is now, do hereby declare :

- That every person is entitled to live in a clean and ecologically balanced environment;
- That future generations of humankind should not be deprived of their share of Earth's bounties;
- That it is every person's duty to conserve, protect and enhance his/her environment.

To these ends, we pledge ourselves and our cooperatives to implement the recommendations of this Conference."

1.7 "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" aptly said by Our Common Future (the Brundtland Report) is also quite relevant to the cooperative initiative. This report, besides generating awareness among the rich and the poor, had a galvanizing effect on international development at this crucial time. Another significant pressure on governments was put by the Stockholm Initiative on Global Security and Governance on "Common Responsibility in the 1990s". In the context of environment the following proposals were made to the international community:

"13. that fees are levied on the emission of pollutants affecting the global environment, in particular carbon dioxide emissions from the burning of fossil fuels;

"14. an international energy dialogue promoting a more efficient use of the world's energy resources, and, in particular, the use of alternative and renewable energy sources e.g. solar energy;

"15. that the United Nations be encouraged to take up environmental issues at the highest level in all appropriate fora; and

"16. that nations resolve to make the 1992 United Nations Conference on Environment and Development a breakthrough for achieving sustainable development."

1.8 The ICA Asia-Pacific Cooperative Ministers' Conference held in Jakarta, February 18-21, 1992 made the following recommendation.

"The Conference took note of the importance being given by cooperatives in regard to protection of environment and promotion of ecological plans by cooperatives in various ways. The Conference appreciated such activities in view of the present situation of environmental degradation. The Conference recommended to develop more intensive environment-related awareness activities by cooperatives.

1.9 The above points are the positive indicators that cooperative institutions and the cooperative members including all those who are responsible for cooperative development e.g. the concerned government departments, have a lot to contribute in protecting our environment and making the cooperative development sustainable.

1.10 The Earth has become hopelessly ill while we have enjoyed the benefits of economic prosperity. We think that something must be done about the situation because we cannot pass an ailing Earth on to the next generation. There are many things which we can do alone as well as together. Either way, we should start where we can.

1.11 In his thought-provoking paper "Cooperatives in the Year 2000", Prof. A.F. Laidlaw stated: "One of the characteristics of present-day society is a growing awareness of social problems. People seem determined to dig out facts and expose the weaknesses in the social fabric and hunt for causes and solutions, for instance, of the neglect of the aged, the abuse of children, the exercise of status and privilege, denial of civil liberties, the treatment given to aborigines, damage to the environment, political corruption or the public cost of private poverty, including the automobile. Groups of people will stand up to oppose, with violence if necessary, what they would have watched and accepted in silence even a few decades ago".

1.12 Refering to environment and the sustainability of cooperative development, Prof. Laidlaw said: "Whatever else may be said about the century now approaching an end, it must be recorded as the period in which mankind has done more to poison and destroy the environment than in all previous eras of history. The industrial revolution of modern times, beginning about 200 years ago, started society on the road to destruction and spoilage of the whole human habitat, using the adage "muck makes money". The degradation of the environment has gone hand in hand with wasteful use of resources and disturbance of the delicate balances of nature.

"Many great lakes and rivers can no longer sustain fish-life because of chemical wastes. Acid rain now threatens to destroy thousands of lakes across Europe and North America. Soil erosion is helping the onward march of deserts on several continents. The great tropical rain forests have been reduced to about 60 per cent of their original size. Many animal species have disappeared altogether and others are threatened with extinction. And now the ultimate pollutant, nuclear waste, is creating environmental disasters that may last for thousands of years. If we think of the earth or the planet as space on which mankind holds a lease, we are now getting close to the time when the lease runs out.

"An important fact of misuse of the environment is that the Western nations and the highly industrialised societies are the worst polluters, as shown by an OECD study published in 1979. It detailed such changers as polluted drinking water, unacceptable levels of aircraft noise, health hazards from chemicals in the soil and general deterioration in the quality of life because of abuse to the environment, especially poisoning of the atmosphere. Recent emergency situations in nuclear power plants also go to show that man-made disasters are not so remote as we may think.

"But the general outlook for protection of the environment is better now than it used to be, as concerned citizens become aware of the urgencies and the need for vigilence. At least, our knowledge of the environment, which was woefully limited until quite recently, is now much better and growing rapidly. If governments will only divert some of the astronomical sums of money and resources away from armaments and towards protection of the environment, there is yet hope for mankind on this score".

1.13 Urging the cooperatives and the cooperative leadership to plan well for the future, Prof. Laidlaw stated: "....We see humanity at as dangerous a point as it has ever been in all recorded history. Of one thing we can be quite certain: cooperatives will be obliged to operate in a world that is largely not of their own making. But this is not to say that people working through cooperatives cannot help to make the future, for indeed this is the central purpose of the Cooperative Movement: to help make a different and a better kind of world. The history of the future has not been written, and cooperators must be determined to have a hand in writing it. In short, cooperators can be active participants in the planning, and indeed creators, of the future, if they only have a mind and a will for it".

Approach to ICA ROAP Study

1.14 Growth in population, shrinking of agricultural land, contamination of air, water and soil, and improper use of technology contribute to the degradation of environment. Healthy environment leads to: i) better standards and quality of life; ii) life support system; iii) conservation and regeneration; and iv) pollution-free environment. In view of the limited information available on this subject in a systematic way, it was proposed that an indepth study is undertaken in the Region covering India, Indonesia, Thailand, Philippines and Japan to : a) identify causes and extent of pollution in the cooperative sector; (b) document measures already undertaken by cooperatives to control pollution and to participate in the sustainable cooperative development process; c) developing local, national and regional plans of action; and d) suggesting measures (long-term and short-term) and activities required to implement action plans. For this purpose the ICA Regional Office indentified and commissioned national consultants to produce comprehensive national situation papers using questionnaires, field on-site visits, interviews and collecting relevant informatory materials.

1.15 An overview paper based on the National Situation Papers was prepared, discussed, reviewed and analyzed thoroughly at a regional workshop held in Jakarta (Indonesia), April 13-20, 1992. The regional workshop developed the following material: (a) Extent of problem in the covered countries; (b) Involvement of cooperatives in these problems; (c) An analytical regional report; (d) A set of recommendations; etc.

1.16 The Regional Study is a participatory exercise being undertaken by the ICA ROAP with the collaboration of its member-organisations. A major part of the expenses to be incurred on the Study would be covered from a grant made available to the ICA ROAP by the Canadian Cooperative Association (CCA). Part of the expenses would be covered by member-organisations in the covered countries. The Indian Farmers' Fertiliser Cooperative Limited (IFFCO-India), a member-organisation of the ICA, has kindly identified one of its senior scientists to work with the project to coordinate the Study and to act as its Regional Consultant. Similarly, the Japanese Cooperative Movement had developed a National Situation Paper based on the outlines of the Study.

Expected Results

1.17 Given below is an indication of the results that would emerge out the Regional Study:

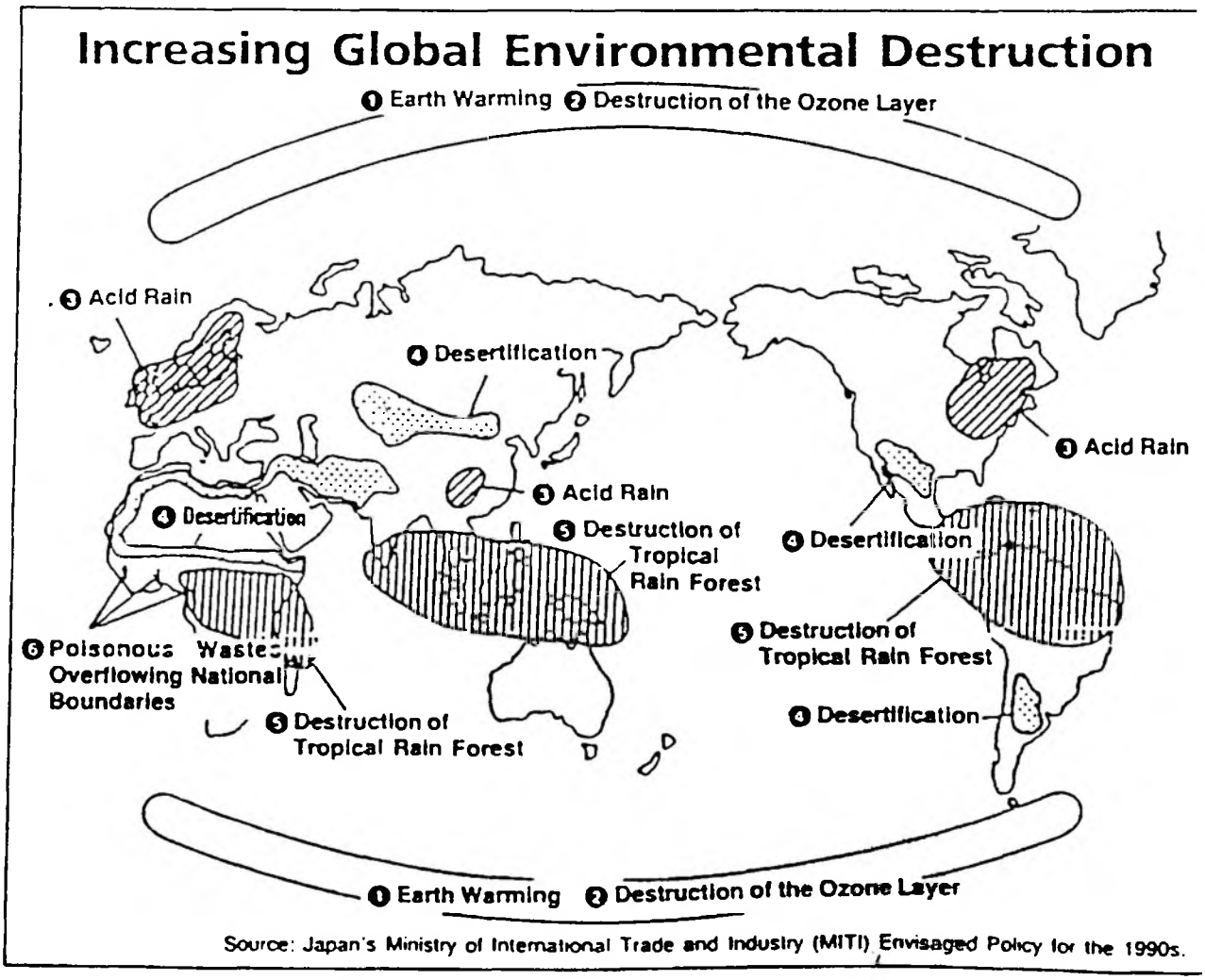
i. A regional study on the subject is carried out in Indonesia, India, Thailand, Philippines and Japan;

ii. Local, national and regional plans of action developed based on first-hand information collected from the field;

iii. Recommendations made to the ICA ROAP on follow-up activities required to implement and monitor plans;

iv. Technical and first-hand material on the subject made available to the cooperative organisations and concerned government agencies in the Region; and

v. Encouragement to member-organisations of the ICA and other self-help groups to develop suitable strategies and participate in generating environment-related awareness material; developing education, extension and training programme; and implementing plans of action.



Source: Japan's Ministry of International Trade and Industry (MITI) Envisaged Policy for the 1990s.

2. ASIA AND PACIFIC REGION - STATE OF ENVIRONMENT

2.1 The Asia-Pacific Region has over half of the World's total population and almost three quarters of the World's agricultural population exists on less than one-third of the World's arable and permanently cropped area. It is estimated that world population in mid-1992 will be 5.48 billion. In 1998 it is expected to reach 6 billion. The annual addition will be about 97 million. Nearly all the growth in population will be in Africa, Asia and the Latin America.

2.2 The population in the Asia-Pacific Region is expected to have doubled from 1980 levels by the year 2000. If this population is to be fed, the rate at which food supplies grow should be greater than the rate at which population increases. Assessment of available land resources suggests that 75% of the extra food should come from higher yields. In turn, these yields will require major crop intensification programmes together with major increases in inputs.

2.3 The Region as a whole has reached or passed the safe limits for the horizontal expansion of agricultural production. As a result the fragile ecosystems of marginal and submarginal lands are being endangered through over-exploitation by man.

2.4 Faced with the twin problems of population pressure and land scarcity the Region's main response, however, has been to increase agricultural production by intensifying cultivation on a more or less fixed land resource base. This has been successful in keeping rates of growth in agricultural production ahead of population growth rates. The question now to be asked is whether growth in agriculture, fisheries and forestry development required to feed and support the ever-growing population can be maintained in a sustainable and environmentally sound manner? As population increases the need to produce more food to feed more mouths gains urgency. If the satisfaction of land hunger leads to the destruction of forests and common lands, the need to increase production results in the application of more fertilisers, more pesticides and more water to the land for irrigated farming.

Forest Resources of the Region

2.5 Forest resources of 16 countries in the Asia-Pacific Region extends over 445 million ha. The countries with more than 20 million ha. of closed tropical forest area in the Region are Indonesia, India, Papua New Guinea, Myanmar, and Malaysia. The annual rate of deafforestation is around 1.815 million ha. or 5,000 ha. per day. The causes of deafforestation are shifting cultivation, encroachment into forest areas for agriculture, organized forms of settlement, and loss of forest area for mining, hydro-electric dams and urbanization. Reafforestation efforts in the past were negligible. In recent years "Social Forestry" or "Community Forestry" programmes are gaining ground. However, reafforestation efforts, which

amount to only about 10% of deafforestation, are inadequate and call for dynamic planning for sustained development of forest resources by developing countries of the Region.

2.6 Analysis of the rates of deafforestation by country shows that Indonesia leads all others with a mean annual deafforestation of over half a million ha; Thailand is the next with 333,000 ha. The range is between 100,000 and 250,000 ha. for Malaysia, India, Laos, Philippines and Myanmar. The least affected countries in absolute terms are Bhutan (2,000 ha), Pakistan (7,000 ha) and Bangladesh (8,000 ha).

2.7 As a consequence of deafforestation and degradation of forest resources, the biological system is near the threshold of a collapse. Unsolved forestry problems in the Region continue to exist and grow. Evidence accumulated has shown that conservation, as well as rebuilding tree cover, is best achieved by people's participation on a decentralized self-help basis. Participation provides the motive force for cooperative action; it helps conserve the natural resources while increasing production.

Pesticide Use

2.8 In 1985, the Asia-Pacific Region accounted for 16% of the pesticide market. The average annual market growth in the Region has been estimated at 5 to 7%. Of the total estimated consumption of pesticides, 75.8% are in the form of insecticides, 13.4% herbicides and 8.4% fungicides. Insecticides are mainly used for rice, cotton, and vegetable; herbicides for rubber, oil palm, tea, coffee and cacao plantations; and fungicides for vegetables, bananas and tobacco.

2.9 Most of the active ingredients are imported from the basic manufacturers in Europe, USA and Japan, although India, Indonesia, Republic of Korea and China are now starting to produce for exports. Most of the countries in the Region have formulation and repacking plants.

2.10 Developing countries in this Region are projected to double their expenditures on pesticides by 1995, assuming current use rates. Most of this increase is expected to occur in agriculture. It is also projected that these countries will continue to increase both the absolute quantities of pesticides they use and their proportion of the total global sales.

2.11 A number of factors contribute to excessive use and misuse of pesticides by agricultural and health workers in this Region. Some of these related to economic conditions and related government policies. Governmental pricing and input subsidies, which are intended to stimulate agricultural production, lower the costs of pesticides and other agricultural inputs, thus providing incentives to use more. In the health sector, subsidies are used because of the importance of lowering the incidence of illness caused by vector-borne diseases. Again such subsidies create incentives to use more pesticides. In many cases the subsidies are channelised

through cooperatives. The cooperatives are also involved in distributing agro-inputs including pesticides directly and also through distribution of credit.

2.12 Many farmers in this part of the world use substantial quantities of pesticides because they find pesticides to be convenient means of pest control and because they lack information on alternatives. Climate is another factor. Tropical climates permit more crop cycles per year than temperate zones, so that over the course of a year greater quantities of pesticides are commonly used. Workers frequently reject protective clothing as too uncomfortable to use in tropical climates.

2.13 Lack of information on hazards is a common contributing factor to pesticide misuse. User illiteracy and warning labels in languages other than that of the users, as is the case in countries with no regulations, impede the communication of appropriate information. Additionally, farmers frequently lack access to technical assistance. Further, lack of proper training on the safe handling and efficient application of pesticides is another important contributing factor to pesticide misuse. In countries where pesticide use is not controlled, agricultural workers often have access and are exposed to highly toxic products which require special protective equipment. Farmers are often unaware of the importance of observing practices that may reduce their exposure to pesticides.

2.14 The problems that result from misuse of pesticides are numerous, most important of which are: human health effects, environmental damage, and pest resistance.

2.15 In this Region, there has recently been great awareness on the need to control the residues on food, especially among agricultural commodities that are exported. A large number of studies have been conducted on pesticide residues in vegetables. In general, conclusions are that the residue levels are below the recommend MRL but that there are cases when these are exceeded and affect the countries exports. Since organochlorines (DDT, BHC, endrin, aldrin) have been used extensively in this Region for the past 10 years, even if banned, residues persist. A number of studies have been conducted to measure the extent of the problem and the impact on soil, water and the fish. In Thailand, for example, organochlorine residue studies from 1976-1985 show that about 50.5% of the water analyzed from canals, rivers, and reservoirs still contain residues; 90.6% of the fish shellfish; and 96.6% of the soil from agricultural fields.

2.16 It is not enough to highlight the problem of pesticide misuse. Awareness of the situation is only the first step. The bigger, more important step is to find solutions to the problem. It was in this light that FAO developed the International Code of Conduct on the Distribution and Use of Pesticides. It is the only international initiative which addresses most aspects of the pesticide problem and seeks to provide acceptable standards of conduct for governments, industry and the general public on the distribution and use of pesticides.

3. CHINA

Waste Resource Recovery and Utilisation in China - A Cooperative Initiative

3.1 Waste materials are often rejected as useless objects in the course of production and peoples' daily life. But in actuality most of these rejects have not yet lost their use value and can be generated as raw material for further utilization i.e., turning the useless into the useful, and turning the waste into treasure.

3.2 Maximized recovery and utilization of the waste material is, in effect, the amplification of mining industries, which contributes greatly to the conservation of natural resources and alleviation of environmental pollution, while boosting production, encouraging social frugality and enlarging employment.

3.3 Following the rapid development of production and increase in the consumption of natural resources, the amount of waste materials is largely enhanced, resource recovery and utilization as a social engineering operation will envisage much wider prospects.

3.4 Government of China has always attached much importance to resource recovery activities, and placed them under effective administration. In the meantime, special economic policies and legal provisions were adopted to ensure the social status, role and production targets for recycling industries. All these are incorporated in the State programme for developing national economy and social progress. For the expansion of recycling industries necessary funds, technologies and equipment are usually provided by local governments.

3.5 After the founding of the People's Republic, the All-China Federation of Supply and Marketing Cooperatives (ACFSMC) set up specialized organisations for resource recovery and utilization. Shanghai Resource Recovery and Utilization Company (SRRUC) is a subsidiary company of Shanghai Federation of Supply and Marketing Cooperatives (SFSMC) and a municipal level recycling enterprise, which was founded in 1956 and is now commanding in the trade throughout the country with regard to resource recovery amount, transaction volume, integrated utilization and operational scale. In other words, SRRUC possesses a complete organizational structure, processing system and business network. At present 16 categories of reclaimable waste material (encompassing more than a thousand varieties) are processed and recycled by this enterprise. These are scrap ferrous and non-ferrous metals, rubber, plastics, paper, cotton, hemp, rags, chemical residues, domestic animal bones, human hair, used glass bottles, old machine and accessories, acids, etc.

3.6 During the 35 years since the establishment of SRRUC in 1956 various kinds of recyclable waste materials were reclaimed totalling 37.02 million tons with a value over 12.6 billion Yuan. The reclaimed raw

materials and products have been supplied to various industries and innumerable households. Besides, to make use of these materials can conserve a lot of natural resources and save energy comparable to 23.62 million tons of standard coal and 2.3 billion kw/h.

Organizational Structure

3.7 SRRUC manipulates resource recovery within the range of Shanghai and undertakes professional dealing and management affairs. It is necessary to set up a complete organizational system to ensure different functional bodies running well, to make timely decision and work out plans to give instructions, and carry out efficient monitoring and coordination. Our organizational structure consists of a municipal company and several district or county branches. Directly subordinating to the municipal company, SRRUC has four business departments, namely, metals, machinery and electric appliances business department; comprehensive waste reclamation business department; rubber, plastics and miscellaneous goods business department; and storage and transportation department. In addition to these there are three direct subsidiaries which are Shanghai Precious Metals Refinery; Haiguang Ferrous Metal Smeltery; and SRRUC Vocational Training Centre. For administration purposes there are 12 district branches and nine county branches. SRRUC and the branches exercise respective administration over all their subordinating waste purchasing, processing and sales units.

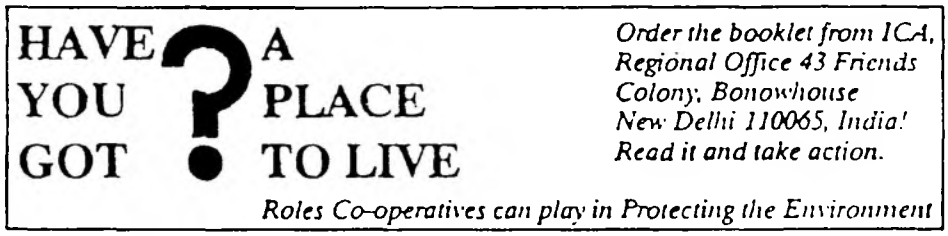
3.8 Now in the districts there are 287 waste materials purchasing stations, and 215 such stations sprawling over the suburban counties under the management of grass-roots supply and marketing cooperatives. The city of Shanghai has 26 comprehensive waste materials reclamation shops, chiefly undertaking the purchase of all recyclable industrial wastes, 66 reclaimed raw materials and products sales departments and 138 such retail shops. Based on the different characteristics of all reclaimable wastes a complicated but streamlined network has been formed for processing old machinery and electric appliances, plastics and rubber scrap, formed steel products and stainless steel, used glass bottles, ropes and threads, paper, hemp, etc. Besides, there are number of big-size shops, renowned shops and shops of special features, all dealing in sales business in large quantities.

3.9 Since waste materials are usually mixed with great varieties and different specifications, they have to undergo processing, such as sorting, classification, removal of dust and impurities and refining, before they can gain reuse value. With this view, under SRRUC and its branches is set up a group of commerce-based industrial enterprises specializing in scrap iron and steel and non-ferrous metals processing, briquetting and precious metals refining, chemical products fabrication, waste rubber and plastics regeneration, and scrap automobiles disintegration.

3.10 SRRUC employs over 21,000 staff and workers, possesses a fixed estate plus flowing capital totalling 430 million Yuan, more than 800

cargo vehicles, 600,000m2 of building space for waste recycling and materials depositing, and thousands of complete sets of processing equipments.

3.11 The above organization structure has basically formed a resource recovery and utilization corporate featuring an overall professional undertaking within the range of Shanghai.



You Can Save The World

- Buy products that come in the minimium of packaging.
- Buy products that come in re-usable packaging - like resealable containers or bottles.
- Get into the habit of taking your own bag with you when you shop
- Don't just throw away glass beer bottles. Return them.
- Don't waste paper. Use both sides of each sheet and reuse envelopes.
- Avoid plastic packaging - fruit, vegetables and meat do not need plastic trays to protect them.
- Look for products that come in simple refillable containers and refill them each time.
- Store food in re-usable airtight containers NOT clingwraps.

Living is polluting. In the industrialised world, each consumer throws out upto 1-1/2 kilos of rubbish everyday. Little is recycled. The world is chocking. Our very presence on this planet makes us all exploiters of its natural wealth and contributors to the mass of waste we collectively spew-out into earth, air and sea. We have pushed the world towards ecological disaster. Now each of us must do our part to save it. Our wasteful careless ways must become a thing of the past. For we do not inherit the earth from our parents - we merely borrow it from our children.

(Reproduction of an advertisement issued by ASEAN PALS OF THE PLANET)

4. INDIA

4.1 The Indian economy is predominantly an agricultural economy. The agricultural sector contributes nearly 40 per cent of the net national product, provides livelihood to 60 per cent of the total working force, and accounts for nearly 35 per cent of the country's exports. The contribution of women in agricultural production is around 52 per cent. According to the 1991 Census, the population of India was 844 million. The density of population is 267 per sq.km as against 216 during 1981. There are nearly 0.6 million villages, 4,200 towns and cities and 422 districts. The country has 31 States. Underlying many of India's problems and running a race with its development is its population growth. A large population would also give rise to large-scale unemployment and create tremendous social tensions and play havoc with the environment. India, the world's second most populous nation, will, by 2025 AD overtake China. Progress in improving the quality of life has been slower than expected.

4.2 Agriculture (including animal husbandry, fishery and forestry) provided employment to the largest chunk of India's labour force.

4.3 There are now more than 300,000 societies in India with a membership of more than 150 million and working capital of Rs.621,440 million. There are 20 national level and 260 state level cooperative organisations. The cooperatives have advanced more than Rs. 50,000 million of agricultural credit of all types. They are handling marketing of agricultural produce of the order to about Rs. 60,000 million have undertaken the distribution of agricultural inputs of about 26,000 million and of consumer goods of the value of Rs. 38,000 million. The cooperatives account of 60.5 per cent of sugar production in the country, 20 per cent of the total spindalage capacity, and are responsible for white revolution which resulted in the abundance of milk in the country.

Afforestation-A Cooperative Effort in India

4.4 The environmentalists and policy-makers of the world have been educating both developing and developed countries on the impending disasters due to excessive exploitation of natural resources. Policy-makers in India have pointed to the crisis that has risen due to the acute imbalance between green cover and the land. It is an undisputed fact that there should be a check on the over-exploitation of nature and the restoration process should start with intensified efforts.

IFFCO Efforts

4.5 The Indian Farmers' Fertiliser Cooperative Limited (IFFCO) has been successful in disseminating new farm technology to the farmers through several extension programmes. Its involvement in rural development has prompted it to launch a project on farm forestry. The project will demonstrate the viability of afforestation on waste-land and will become a model for involving the people in afforestation through Farm Forestry Cooperatives.

4.6 The project has been designed and is being implemented to meet the following specific objectives:

- to promote tree plantation on waste-lands and sub-marginal lands and help in restoration of ecological balance;
- to generate sustainable rural employment and help in the economic development of rural poor;
- to promote afforestation as a people's movement and make in ongoing by organizing village level farm forestry cooperatives; and
- to develop a model for promoting afforestation on the lines of integrated farming system.

People's Participation

4.7 Creation of an institutional structure for bringing the rural population together for this noble but gigantic task was undertaken. Village level cooperative institutions were organized in the project area. Up till now 33 primary cooperative societies have been organized of which 29 have already been registered. The societies own capital items, create irrigation facilities (tubewells etc) raise centralized nurseries and provide services which are common to all members. The societies will also make necessary arrangements for marketing of main produce and recovery and repaying of loans. The societies are the centres for all extension and educational programmes and are also responsible for arrangement of funds. In all, 4040 ha waste-land has been put under green cover in the states of Madhya Pradesh, Uttar Pradesh and Rajasthan since 1987.

4.8 By-laws for a multi-state cooperative society, a federation of all the primary societies, have been prepared and the Central Registrar of Cooperative Societies has agreed in principle to register the society.

NDDB Efforts

4.9 The National Dairy Development Board (NDDB) initiated a pilot project on Tree Growers' Cooperatives (TGCs) in five states viz Gujarat, Rajasthan, Orissa, Karnataka and Andhra Pradesh in 1986. By July 1991, there were over 101 registered societies and 12 functional but not registered TGCs. Over 1000 ha of land been leased and over 1.75 million trees planted so far. Supplementary activities have also been carried out along with the plantation programme. In Energy Conservation Programme over 3000 smokeless chulhas and over 60 bio-gas plants have been installed. Various training programmes for farmers and especially for women have been organized in all districts.

4.10 Nearly 500 questionnaires were mailed to a variety of cooperative institutions in the country. Several field trips to a variety of cooperatives and interviews with a cross section of the cooperative community were also undertaken.

4.11 The study discussed in depth and the present environment status in different segments of the Indian Cooperative Movement. These included: fertiliser cooperatives, petrochemical cooperatives, housing cooperatives, rubber cooperatives, sugar cooperatives, oilseeds cooperatives, cooperative training institutions, marketing cooperatives, dairy cooperatives, consumer cooperatives, credit and banking cooperatives and forestry cooperatives.

Consultation at the National Level

4.12 The study has also taken into consideration the discussions that were held at a National Workshop on "Role of Cooperatives in Preservation and Protection of Environment" by the National Cooperative Union of India in July 1985. The National Workshop had proposed a set of recommendations and an Action Programme for Cooperatives. Following are the excerpts from the Action Programme.

4.13 In the context of nature of activities required to be undertaken in regard to environmental development, the following may be visualised as an Action Programme for societies.

Land and Water Resources

Land : To protect land resources consisting of land and forests cooperatives may undertake following activities:

a) Making arrangements for providing farm guidance to the members specially in regard to crop husbandry practices and use of inputs.

b) To protect soil erosion by providing necessary financial support to the beneficiaries.

c) The village level agricultural cooperative societies, in collaboration with village panchayats may initiate social forestry programme on the land of their members.

d) Organisation of social forestry cooperatives of landless agricultural labourers on waste lands in the villages.

e) In urban areas, housing cooperatives may undertake social forestry programmes in the settlements established by them.

f) Cooperative processing units e.g., sugar factories, spinning mills, oil mills may also motivate their members to undertake social forestry programmes.

g) Forest labourer's cooperatives should prepare well thought out plan for the development of forest coupes allotted to them.

Water : Water resources have to be protected and preserved for drinking and irrigation facilities. Still on both these counts, country is facing great difficulties. The problem is to stop wastage of water resources due to floods, to ensure equitable distribution of water resources for the benefit of largest number of beneficiaries and to prevent water logging.

Drinking Water Facilities : Drinking water problems are generally faced in rural areas. Still there are a large number of villages without drinking water facilities. Cooperatives may take up following steps to solve drinking water problems in their areas:

a) Village cooperative societies and village panchayats may collaborate in creating drinking water facilities while village panchayats may make land available to set up well or tube well, cooperatives may bear the cost of construction.

b) Cooperatives for creating drinking water facilities may be organised. Big cooperative organisations like cooperative sugar factories, cooperative spinning mills may also start cooperative drinking water facilities in their areas.

Water for Irrigation : (1) Organisation of lift irrigation cooperative societies; (2) Organisation of ground water irrigation cooperatives for tube-well irrigation; (3) Ensure liberal financial assistance to farmers for setting up their own tube-wells/wells for irrigation purposes; (4) Priority consideration to cooperative beneficiaries in respect of energisation of their wells; and (5) Organisation of water users' cooperative societies in canal and command Area Development Project areas.

Protection of Water Pollution : It is the basic responsibility of the State to take care of public health and sanitary welfare of its citizens and cooperatives are very remotely concerned with the problem of water pollution. However, water user cooperatives and fishery cooperatives may take up aqua-culture particularly for development of fisheries. It is said that the fish can help in preventing pollution of water.

Energy Alternatives : There are two aspects of energy problems in India. One is to ensure continuous supply for production purposes and second is to give its advantage to the poorer section of the community. In this context, the Cooperative Movement can help in solving the energy problem in the country. Some of the steps suggested are as follows :

(a) Expansion of Rural Electrification Cooperatives; (b) Easy financial assistance may be made available by cooperative financing institutiions to the rural people for installation of bio-gas plants; (c) Village level cooperative institutions may instal wind mills; (d) In urban areas, possibilities may be explored for organising cooperative for solar energy in different colonies; and (e) Consumer cooperatives may market solar energy equipments for home use purposes.

Natural Living Resources : In this sphere cooperatives have very little responsibility. It is the Government which is basically responsible for protection of natural living environment. However, it is worth considering that for management and protection of national parks, the cooperatives of tribals may be organised.

Environmental Pollution : To mitigate the problems of enviromental pollution, the basic responsibilities lies with the Government and cooperatives are very remotely connected with this aspect of environmental protection. However, the following steps may be taken by cooperatives:

(a) The cooperative industrial units like IFFCO, KRIBHCO, PETROFILS, Cooperative Sugar Factories, etc. may prepare well thought out plans for the development of environment in their factory areas. All steps will be taken that cooperative industry activity does not create any environmental pollution in the area; and
(b) Many a times tragedies occur on account of environmental pollution, e.g. Bhopal gas incident. Cooperatives can help in rehabilitating such victims and also in ensuring timely supply of essential commodities to such victims.

Urbanisation : The problems that emerge out of the urbanisation need to be tackled by the Government. In this context, the cooperative colonies set up by housing cooperatives can supplement the efforts of the Government to keep environment in and around localities neat and clean. In the re-settlement colonies, service cooperatives consisting of all the residents of the colonies may be set up to take care of environmental problems of the locality. This will also ensure peoples' participation in the environmental development programmes.

Creating Awareness Among the Public : Cooperatives can play a very important role in creating awareness about the development of environment as they are peoples' institutions. Cooperative education and training programmes may be suitably oriented to include need, importance and scope of environmental development, so as to make the members and workers of cooperatives aware and responsible towards environmental development.

Action Programme

4.14 The study has suggested the following action programme for the Indian Cooperative Movement:

i. Pollution control systems are very capital intensive and many a times costlier than the original plant cost. It is therefore, essential that Governmental and Institutional agencies including NCDC make provisions of subsidy/soft loan to the extent of 75% of the project cost so that cooperative industries can take up effective installation of pollution control systems.

ii. Research process for evolving cheap and effective control systems of pollution of industrial effluents need to be strengthened through the R&D activities of the cooperative organisations.

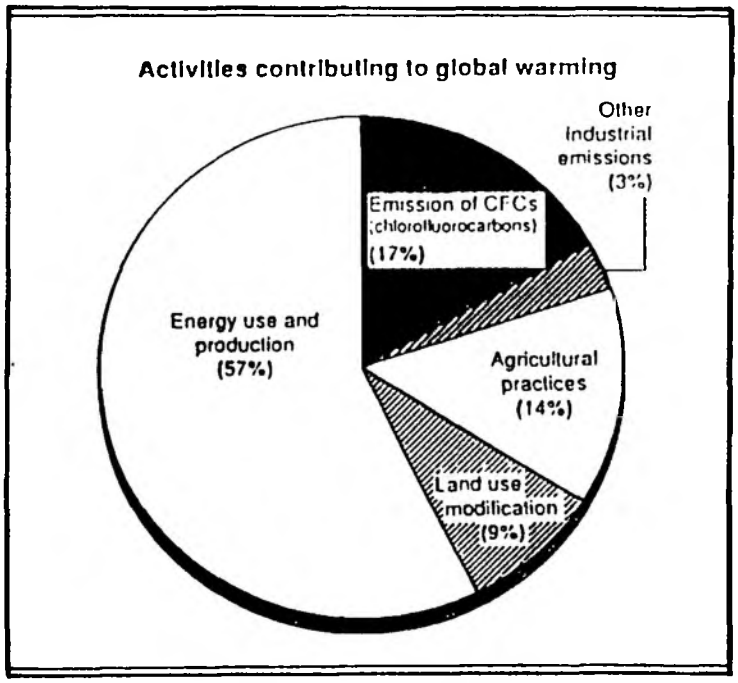
iii. A constortium of cooperative experts in different sector of industries for developing pollution control technologies be constituted which will also help in setting up project designs which are environment-

friendly. The consortium may also take up the responsibility of experience sharing within cooperative sector.

iv. An "Environment Fund" may be created to carry out awareness programme and follow-up activities. It will also be appropriate to create an "Environment Cell" in cooperatives, which can take initiative and lead in developing educational material and publicity campaign for keeping the environment clean and sustaining the cooperative development.

v. The Cooperatives with vast proliferated network can be actively associated with programmes of awareness for environment protection. Much of the environment degradation is the result of lack of awareness. The member education programme, therefore, should also place emphasis on environment protection, cleaniness etc. Cooperative Unions in India should take lead in this direction. This will help in motivating individual members of the societies to participate voluntarily in environment conservation activities.

vi. Awareness creation through seminars, meeting, conference regarding the environmental cleaniness in respective sector should also be encouraged. Leading cooperative institutions can take active role in organising such programmes. A national level seminar in this direction would be a welcome move. The ICA Regional Office in collaboration with national level cooperatives under the aegis of NCUI may take up this responsibility.



5. INDONESIA

5.1 There are 36,466 cooperatives of all types with a membership of nearly 25 million. The cooperative cluster consists of two major types, 8,345 KUDs (village level cooperatives) in the rural areas and 28,121 non-KUDs (comprising of functional, workers, multipurpose non-Kuds, handicrafts, market vendors, transport and others) in the urban areas. Agricultural cooperatives cover almost 19.5 million individual members.

5.2 A national study on "Environment and Sustainable Cooperative Development" was carried out by the DEKOPIN (National Cooperative Council of Indonesia) with the active assistance of the Indonesia office of the Canadian Cooperative Association. First hand information was collected through 500 questionnaires sent out to a variety of cooperatives in all parts of the country, on-site visits and interviews.

5.3 The major issues encountered in agricultural/consumer cooperatives confirm a concern voiced in the Chiangmai CCA Conference that agriculture has become an important non-point source of water pollution, ultimately entering even the food chain. It not only destroys natural habitats and ecosystems, but above all, its own productive resources through erosion, lose of genetic diversity, poisoning of the natural enemies of pests, poisoning of drinking and irrigation water, acidification of soils.

5.4 The two cooperatives visited said that often packages of fertilizer have no instructions and although pesticides are labelled many farmers do not understand or read well enough to assure correct usage. Staff of the cooperative were unaware of the toxic effects on farmers and/or crops, or of the pesticides which are banned - they themselves selling one - diazinon.

5.5 A large dairy cooperative near Jakarta, reported problems in disposing of both the effluent from the milk processing as well as the manure from the large number of cows which they handle on a daily basis. An added concern was the disposal of the returned pasteurized milk left unsold - this they had not yet been able to solve - but is clearly a threat to water quality.

5.6 An associated environmental problem in dairy cooperatives is overgrazing of pasture land and is a primary livestock management problem. On Java also the basic diet for dairy cows consists primarily of cut-and-carry green roughage and either rice bran or commercial concentrate. The lack of a resource management system, will lead to decreased ground cover, subsequent erosion, reduced water retention and declining soil fertility.

5.7 Often cooperative staff are more aware of environmental problems generated by nearby activities than by their own activities as was the case in the Gresik fishery cooperative visited. While they admitted an "odor" problem from their fish shipping activities this was of minor importance

when compared to the impact of the nearby chemical factory. They claimed the factory's effluent was decreasing their catch, harming shrimp spawning grounds in their area, and had already decreased the demand for the locally produced salt. They did not know what could be done about this.

Pollution and Waste Disposal

5.8 Respondents showed a greater awareness of highly-publicized problems such as air-soil-water pollution and waste disposal than of more technical problems such as the use of dangerous chemicals (pesticides, for example) or of non-recyclable products such as plastics. Yet less than half (42%) indicated that pollution was of particular concern in their cooperatives, and only 22% indicated that their cooperatives were aware of the hazards of the indiscriminate dumping of waste.

Energy

5.9 The percentage of respondents indicating an awareness of the problems of excessive energy use was not high in absolute terms (16%). But was significantly higher than the percentages in other areas surveyed.

Recycling

5.10 The very low percentage of respondents who indicated some awareness of the need for recycling is probably not an accurate measure of actual conditions in cooperatives, for the following reasons :

* The term for "recycling" in Indonesian (daur ulang) may not have been clearly understood by respondents; and
* in Indonesia, as in many developing countries, whatever can profitably be re-used will be recycled.

5.11 That this "scavenging effect", a form of non-systematic recycling, occurs regularly, is suggested by the fact that whereas only 3% of respondents indicated that their cooperatives engaged in recycling, 28% indicated that waste materials in their cooperatives were frequently re-used.

Awareness Related to Activities

5.12 There is a consistent drop of about 1/2 from figures measuring awareness of particular problems to figures measuring actual programmes and activities employed to solve those problems. This pattern is observed in almost every area of concern surveyed, including pollution (42% awareness, 21% activity), waste (22%, 12%), and energy conservation (16%, 9%). Since the pattern is consistent across a number of areas, there is some reason to believe that a greater awareness of environmental problems in the future will be accompanied by increasing action-that the dissemination of information is effective.

Environmental "Green" Office Policies

5.13 The percentages of those who indicated that environmentally sound policies have been instituted in their cooperatives' offices were relatively high : 34% stated that it was office policy to conserve electricity, and 18% stated that they recycled glossy paper. Even if these numbers are accurate, however, it cannot be assumed that such policies represent the behavior of cooperatives as a whole. Office workers, who constitute only a small part of the total membership of cooperatives, have greater access to publicized information. On the other hand, the figures would appear to offer evidence of the relation between awareness and activity, and to suggest that cooperatives' offices might be useful in spreading information.

Effects of Environmental Awareness Training

5.14 Although the survey showed that high levels of both awareness (44%) and activity (43%) had been sustained in cooperatives without the benefit of any training at all (seminars, conferences, formal instruction, counseling), it should not be concluded that training has no significant effects. Of the 26 respondents from Java who indicated that they had some training, all showed awareness of environmental issued and 22 stated that their cooperatives had instituted special programme to deal with environmental problems.

5.15 Significant environmental issues identified by this study are:

* water pollution caused by :
  - the mis-use of pesticides and fertilizers;
  - the distribution and sale of illegal pesticides;
  - insufficient awareness and knowledge of the dangers of incorrect use on crops, ecosystems and to people;
  - effluent from fish meal factories, tahu production, dyes from textile production and chemicals from leather tanning:
  - indiscriminate disposal of diary products and cows manure;
* air pollution caused by:
  - the incorrect preparation and spraying procedures used by farmers;
  - the use of leaded gasoline;
  - tahu and fish meal production:
  - improper disposal of diary products and cows manure:
* soil erosion caused by:
  - farmers livestock management practices particularly on upland areas;
  - the need to extend feeding areas for livestock;

* deforestation and endangered species are caused by:
  - the use of hardwood and ratan from unsustainably.

5.16 The key to environmental development is the participation, organisation, education and empowerment of people. Sustainable development is not production-centered, it is people centered. There is a strong need for identifying critical issues around which specific action programme could be built.

5.17 The study discussed logical steps to be adopted to design an environment awareness programme. Its basic components are :

- Identify Critical Environmental issues related to cooperative's activities through discussions with:
  i. Decision/policy makers in DEKOPIN, Cooperative Federations the Ministry of Cooperatives, KLH, Bapadal and various national and international NGOs.
  ii. Policy Implementors such as Board of Directors in Primary Cooperatives and Managers.
  iii. Cooperative Members
    * Identify critical environmental issues and/or activities related to cooperative's activities through field visits and survey forms to selected cooperatives in Indonesia;
    * Define the objective or desired change for each level (policy or implementation) and for each critical issue;
    * Define the target audience, determining why these people are important and how they effect the critical issues;
    * Create and communicate the message so that it reaches the target audience;
    * Choose the tactic or media mix that will most effectively communicate the message to the target audience; and, once the program is implemented;
    * Monitor and evaluate results, making modification when necessary.

5.18 The study identified the following programmes to be developed for implementation:

1. Pesticides and Fertiliser Awareness Programme
2. Livestock Management and Soil Conservation Programme
3. A "Green Labelling" Certification Programme
4. Industrial Waste Minimisation Programme for Small Industries
5. Protection of Endangered Species.

5.19 Ignorance of environmental issues can be found in all sectors of the society. Hon'ble Emil Salim, Minister for Population and Environment

warned that "the environment will not be able to support human life if the present policies of energy, transportation and industry continue in perpetuity." This implies that environmental degradation is structural and unless political, social, cultural and economic structures are transformed. the root causes of environmental degradation will not be reduced. Strategies for structural change has been described as "thinking globally and acting locally". Individuals and communities can make a difference and cooperatives are an ideal vehicle for this task.

見つめよう  暮らしと地球

Symbol of environment-friendly merchandise sold through consumer cooperatives in Japan

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"While national awareness planning and action plan is necessary, a real work could be done at the basic level. Cooperative institutions can interact strongly with the rural local self-government agencies in order to develop an integrated environment development strategy. This would involve awareness, extension, training development activities. A strong well-informed and properly trained cadre of environment-conscious "missionary" workers has to be developed who could provide, on a regular basis, education and information on various aspects e.g., rural / general sanitation, farm guidance, hygienic warehousing and handling of products, automobile / farm machinery maintenance and management, afforestation, water testing, soil testing, systematic handling of chemicals and fertilisers, disposal of garbage, recycling of waste material, setting up of biogas plants, family welfare and child care etc.etc. The national and provincial cooperative (business) organisations can formulate strategies, develop and provide back-up services e.g., curricula, trainers' training and extension of field material, training packages, handbooks, and also identify, secure and provide proper funding for implementation of programmes. Vocational training facilities for rural youth should also be created; e.g., repairing of household items, cycles, motor cycles, electrical items, welding, carpentry etc".

- Daman Prakash

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6. JAPAN

ENVIRONMENTAL PROBLEMS AND MOVEMENTS OF JAPAN'S COOPERATIVES.

Global environment and involvement of Japan

6.1 Japan has high production and consumption levels in her economic and social activities, thereby putting a large burden on global environment. For example:

(i) Japan accounts for 2.4% of world's population and 12% of world's GNP, though being only 0.3% of the total land area of the world (1986).

(ii) Japan accounts for 4.7% of world's consumption of fossil fuel and 4.7% of world's CO2 emission, each ranking fourth in the world (1986).

(iii) Japan produced approx. 130,000 tons of freon gas which is destructive to the ozonosphere, accounting for about 11% of world's total production (1986).

(iv) Japan's import of tropical hardwood timber accounts for 36% of world's total trade in the form of a long (55% of total timber trade of tropical wood producing countries) and 21% of world's total trade in the form of sawn wood (6% of total sawn wood trade of tropical wood producing countries). (1988)

(v) Japan's import of agricultural products amounted to $26,500 million (1989), which is 30 times the amount for 1960. As a result, the rate of self-sufficiency in agricultural production became 48% on caloric base and the rate of self-sufficiency in cereals became 30% (1989).

Environment Problems and Activities of Cooperatives

Agriculture

6.2 Environment problems identified in the agriculture, forestry and Fisheries sectors are as follows:-

- Mechanisation of agriculture, input of large quantities of chemical fertilisers and agricultural chemicals, as well as specialised production of selected crops, facilities agriculture using vinyl houses or green houses, diversification of crop type and the increase in the size of stock raising and orchards have progressed leading to the large energy consumption type agricultural production.
- Health problems and safety of food in relation to industrial pollutions, and the practice of organic agriculture with low input of chemical fertilisers and agricultural chemicals has spread gradually.
- In the midst of the decrease and aging of agricultural population, securing agricultural workers, promotion of the development of

disadvantaged districts such as mountainous and isolated region, establishment of farming methods compatible with the environment and securing the adequate incomes are major questions to be tackled.

Forestry

- Excess and indiscriminate cutting to supply wood as military materials during the war and as reconstruction materials during the postwar period subsequently caused frequent occurrence of floods following the typhoons and heavy rainfalls.
- Securing forestry workers to cope with the decrease and aging of rural population, improvement of forest road networks and promotion of mechanisation of forestry work and expansion of demand for lumber are the major problems to be solved.

Fisheries

- With the growth of industries centering around the heavy and chemical industries since the 1950's, damage to fisheries due to pollution of the sea and rivers became apparent.
- In the 1970's fishery damages as the occurrence of red tides and oil contamination caused by domestic waste water in addition to industrial waste water became more serious. The Fishermen's Cooperative Association has held a number of national meetings of fishermen to appeal for damage compensations and strengthened measures for the protection of sea environment.
- Launching a nationwide campaign for the protection of environment of fishing grounds and carrying on a seashore cleaning and beautification drive by its members and officials, materialisation of a national movement is desired for the protection of the sea and rivers.

Basic Considerations for the Question of Environment

6.3 Based on the organisational objective and fundamental values of cooperatives the conservation of environment is a basic subject of the Cooperative Movement.

Environment Conservation movement of 25 million members

6.4 Aiming at the conversion to a life style tender to the earth, the 25 million members will launch such environment conservation movements as a drive to review one's life and community, a drive for production and consumption tender to environment, creation of a community that protects "water and greens", etc.

6.5 25 million members comprise 8.5 million NOKYO members, 14.1 million SEIKYO members, 520,000 GYOKYO members and 1.76 million SHINRIN KUMIAI members.

ENVIRONMENTAL PROTECTION ACTIVITIES OF CONSUMER COOPERATIVES IN JAPAN

6.6 In Japan Consumer Cooperatives were implementing a wide range of activities to conserve the environment with emphasis placed on the preservation of the water environment including the development and promotion of "better washing agents" during the period of the 1960s to the 1980s. In order to further develop the environment conserving movement in the 1990s JCCU set up "the Environment Policy Committee" composed of the board members of Consumer Cooperatives and the environment experts in November 1990 with the object of "studying the basic direction of the Consumer Cooperative activities by grasping the national and international trend related to the environment issue". A report titled "Consumer Cooperative's Environmental Preservation Movement; Its Concept and Guidelines" was issued in March 1991.

6.7 And then many Consumer Cooperatives formulated a policy on their environmental protection activities with the members participating. In fiscal 1991 every Consumer Cooperative positions the environment issue as the fundamental theme of the Consumer Cooperative activities and is implementing a wide range of environmental protection activities including the members' activities such as reviewing lifestyle, recycling and environmental monitoring, the development and promotion of "environmentally friendly products", environmental care in business operations of stores and so on and networking for environment protection.

The Object and Methodology of "Environment Programme towards the 21st Century"

6.8 JCCU's "Environment Programme Toward the 21st Century" is intended to frame concrete action programmes for the Japanese Consumer Cooperatives to implement based on the above mentioned awareness and a report titled "Consumer Cooperative's Environmental Preservation Movement: Its concept and Guideline" submitted by the Environment Policy Committee in order to establish the environment conserving society toward the 21st Century of "the Era of the Global Environment".

Four Projects of "Environment Programme"

Project 1: Ecological Guidelines for Products. Its object is : Developing Environmental Impact Analysis (Life Cycle Analysis) for products in place of individually developing environmentally friendly products.

Project 2: Ecological Standards of Cooperative Business Operations. Its object is : Controlling environmental burdens and contributing to environmental conservation throughout business operations. Preparing concrete model plans for stores, and building prototypes. And then developing, prototypes for distribution centers, processing plants and offices.

Project 3: Ecological Workshop. Its object is Reviewing lifestyle and communities with environmental conserving effects specified.

- Developing "Environmental Clinical Chart" based on environmental monitoring and observation activities in communities.
- Developing "Environmental House-Keeping Book" with environmental protection effects specified scientifically
- Preparing "Data Base for Ecological Lifestyle" based on lifestyle of members.
- Establishing "Methodology for Members to Participate" in developing these tools.

Project 4: Recycling Systems object is : Challenge to new practical subjects to promote recycling.

- Study of technology and equipment of the whole recycling
- Design for concept of recycling center
- Feasibility study.

Development and Promotion of "Environmentally Friendly Products"

6.9 While "Ecomark System", which is similar to the Blue Angel Mark of Germany, has already been established by the Japan Environment Association under the auspices of the Environment Agency. The JCCU certifies "environmentally friendly products" on its own judgement, labels the unified Consumer Cooperative environmental mark on the certified products and promotes the marked products to the members.

6.10 JCCU has set up "Environmentally Friendly Product Council" composed of representatives of the members, representatives of officials and staffs of Consumer Cooperatives and experts in order to check and select "environmentally friendly products" as of February 1992.

6.11 As for the recycled paper products the supply of toilet papers and tissue papers made from recycled papers had been greatly increased. JCCU introduced toilet paper "Core-Non Roll" made from 100% recycled paper in place of that made from virgin pulp in October 1991. This spring JCCU replaces all "Core-Non Roll" products by nonbleached products as a part of the measures to reduce the emission of dioxins.

6.12 Furthermore, JCCU is making an effort to save resources, to save energy and to reduce waste.

Ecological Standards of Business Operations

6.13 The Japanese Consumer Cooperatives have replaced paper products used in their business operation such as leaflets, pamphlets, catalogues, envelopes, business cards, copying paper and paper for computers with recycled paper products.

6.14 Many Consumer Cooperatives have introduced systems of giving a refund to any member who carries their own shopping bag and does not use carrier bags during shopping or charging shoppers for carrier bags.

6.15 Use of PVC packaging for Coop products will be reduced by 50% by September, 1992.

6.16 As a part of the environmental consideration within stores and premises and such experiments as introducing solar energy systems were started in some Consumer Cooperatives including Coop Kanagawa and Meikin Coop.

Environmental Protection Activities Based on Members Activities of "Reviewing Lifestyle"

6.17 The members of COOP Kobe, who have experienced "environmental checking activity" for many years, prepared a checklist for everyday life this year, too and is promoting the activity to review lifestyle to other members belonging to "Han" group.

Members' Activities of Monitoring the Environment for Pollutants

6.18 Monitoring the atmosphere for NOx by a simplified method has been typical of environment monitoring activities.

6.19 The manual and color slides for monitoring were prepared by JCCU's Regional Office for Central Area Serving the Kanto and Koshin-etsu Districts, and monitoring the atmosphere for pollutants was implemented all over the area.

6.20 Activity of monitoring the acid rain is spreading among many Consumer Cooperatives.

6.21 Activities for monitoring water quality, visiting water purification plants and sewage treatment plants and surveying aquatic living things are being implemented in many Consumer Cooperatives.

6.22 Recycling of used metal cans has been expanded to many Consumer Cooperatives. Collecting boxes for used cans have been set up at around 200 stores of Cooperatives in large cities and collected cans are submitted to recycling.

6.23 New legislation and requires producers or distributors of canned beverages to label a message of "Recycle Used Can" and an identification marking of "Aluminum Can" or "Steel Can" on their products put into the market since last October. JCCU started to introduce the new label on its canned beverages before the legislation became effective together with introduction of a stay on tab in place of a pull tab.

6.24 Two important international conferences on the environmental activities organised by Cooperatives are scheduled in Japan this year.

One is Environment Workshop. Environment Workshop is an international conference of Consumer Cooperatives on the environment, which is organised by ICA Consumer Committee and Consumer Cooperative of the host country and is held every year since 1990 with the object of exchanging environmental protection activities implemented by Consumer Cooperatives all over the world and extending international collaboration for conserving the environment.

6.25 JCCU would like to introduce environmental protection activities of Consumer Cooperatives in Japan as well as to learn from various environment protection activities implemented all over the world including Asia and the Pacific, and would like to express a resolution to positively participate in international activities to deepen international collaboration and solidarity.

Cooperatives Can Undertake the Following Principal Activities :

- *Creating awareness among the people on the consequences of increase in population. Special programmes on population control can be undertaken by cooperatives in collaboration with government concerned agencies.*
- *Creating awareness among the people on the consequences of cutting down trees indiscriminately.*
- *Creating awareness among the people on the consequences of flow of waste water in village streets.*
- *Creating awareness among the people on indiscriminate mining and digging up soil for brick-klins etc.*
- *Educating farmers on the use and handling of chemical fertilisers, insecticides and pesticides e.g., DDT.*
- *Educating people on the importance of washing vegetables and fruits before consuming them.*
- *Informing people on the use of alternative sources of energy for cooking, heating and lighting.*
- *Encouraging people to develop social forestry programmes, and*
- *Encouraging people to participate in community development programmes e.g., rural sanitation, cleaning of school premises, cleaning of village streets, repairing of leaking water taps, discussions with the nearby factories or mills, developing modest rural health programmes, better management and regreening of waste land etc.*

The main emphasis of cooperative extension activities should really focus on population control, stopping the rural youth from moving away from the rural areas to the cities (perhaps due to lack of employment opportunities in the villages, and also perhaps due to the lack of vocational training opportunities in the villages), soil erosion, tree planting, education of members, and making the cooperative as an economic centre of the village.

- Daman Prakash

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7. PHILIPPINES

The Philippine Environment and Sustainable Cooperative Development

7.1 The Philippine started to re-evaluate its development thrusts in the wake of massive environmental destruction brought on by past development activities. More and more, various sectors are clamouring for the pursuit of development which would be equitable and sustainable.

7.2 Cooperatives represent the interest and welfare of their members who predominantly come from the middle and low income sectors of the population.

7.3 Within the Cooperative Movement in the Philippines, the matter of environment/ecology is a fairly new concern and has just begun to capture the attention of both public and private cooperative policy-makers.

7.4 The Philippine Government launched its comprehensive programme of environmental protection and management and established specific environment management policies and environment quality standards, and embodied the same in the Philippine Environment Code.101.
The Department of Environment and Natural Resources (DENR) is the primary government agency responsible for the sustainable development of the country's natural resources and ecosystems.

7.5 Government policy and programme on the role of cooperatives in environmental/ecological matters are not very clear. Fortunately, the Philippine Strategy for Sustainable Development (PSSD) has a strategy for strengthening of citizen's participation in environmental management.

7.6 The National Confederation of Cooperatives(NATCCO) has taken the lead and as an ICA member agreed to a resolution on environment and development in September 1990 urging member- organisations to join efforts to address environmental issues.

7.7 As Asian partner of the Canadian Cooperative Association it met with 31 other national representatives in Chiangmai, Thailand. The Conference came up with programmes, strategies and action plans for making environment an integral part of sustainable cooperative development.

7.8 Its affiliates have included environmental/ecological matters and importance of environmental-friendly actions like the use of organic fertilisers instead of chemical fertilisers.

7.9 The NATCCO plans to: (1) Source funds for environmental programmes; (2) Create taskforce to link with NGOs and GOs; (3) More intensive educational programmes to encourage concrete actions on environmental issues; information sharing; and (4) consideration of planting trees as an added requirement for membership in a cooperative.

7.10 The Cooperative Union of the Philippines (CUP) and its concerned affiliates have embarked on negotiations for the establishment of pilot programmes on water resource recovery and utilisation in Davao City and Quezon City involving the Davao Fibers Producers Cooperative Inc. (DFPCI) and the Quezon City Federation of Cooperatives Inc. (QCFCI), with the support of the Regional Cooperative Union, Inc., and the National Capital Region Union of Cooperatives Inc. respectively, and the city governments (Davao City and Quezon City, respectively) since 1989. This is in pursuance to the ICA policy of protecting environment, the conservation of natural resources and pursuing sustainable cooperative development programmes.

7.11 The CUP has so far been involved in the following CORPROTEC activities: (a) Safety and environmental protection conscientization through newsletter/bulletin quarterly publication; (b) other mass media information dissemination; (c) advocacy and policy initiatives; (d) holding of continuous consultation and preparation of essential baseline data on subjects like "Chemical Hazards Evaluation" and "Status of Occupational Safety and Health".

7.12 Among the planned thrusts of CUP for the protection of environment as part of its sustainable cooperative development are: (1) policy initiative on legislation; (2) drawing up model cooperative by-laws to include environment protection; (3) inclusion of environment protection in the cooperative training; joint programme with the Department of Interior and Local Government regarding local waste disposal and recycling; (4) conduct of national conference on Coops and Environment, among others.

7.13 The National Market Vendor's Service Cooperative Inc.,(NAMVESCO) has embarked on a programme of collaboration with local governments in the maintenance of health and sanitation standards in the public and private markets where their members operate. The Philippine Federation of Credit Cooperatives (PFCCI) advises farmers and fishermen to use organic fertilisers and legal methods of fishing. The Batangas Sugar Plantation Cooperative Marketing Association, Inc., (BSPCMA) suggests tree planting/reforestation by local governments; preventing tree cutting in highlands; and representation with local authorities to require firms to use anti-pollution control devices.

7.14 The CUP Cooptrade Project is promoting and selling a biodegradable laundry soap. The NAMVESCO's members have produced a laundry bar soap ("Coop Soap") which they sell at prices lower than the leading brands.

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8. THAILAND

Environment and Sustainable Cooperative Development in Thailand

8.1 The rapid growth of population and mismanagement of natural resources have accelerated destruction of resources and also created conflicts and pollution problems.

8.2 The most recent study by the Royal Forests Department indicated that there is only 28% of forest area while the national policy calls for the preservation of 40% of Thailand's forest area.

8.3 Cultivable land area is about 65% of the country's total area. The per capita arable land is down to only 3.103 rai (4,965 m2). Moreover, there is evidence of degradation and erosion of Thai soils. The agricultural land has also been misused. The cultivation of paddy on unsuitable soils alone amounts to 13.48 million rai, and the growing of upland crops on unsuitable soils accounts for a further 14.58 million rai.

8.4 The increase in demand of water for domestic and agricultural purposes as a result of population expansion has caused the problems of water shortage and conflicts among water-users for various purposes, including conflict in development and preservation of water resources.

8.5 Development of large-scale water sources is still lacking in efficient water management system including appropriate continuous projects, and also resulted in low rate of irrigation water utilisation which is only 15% instead of 60-70%. In Bangkok and surrounding areas, the groundwater has been highly utilised for domestic and industrial purposes. The level of groundwater has been lowering 2-4 meters yearly and has caused sinking of the ground at the rate of 10 cms each year.

8.6 Quality of water in the main rivers such as Chao Phraya River and Tha Jeen River including quality of water along the beach in tourist area is now lower than standard quality.

8.7 Environmental problem from polluted air can be seen clearly in the big cities like Bangkok, Chiangmai and Songkhla. The main cause of air pollution derive from dust, carbonmonoxide and lead. Generally small industrial plants have no pollution treatment system.

8.8 There were some limitations in development of environment in the past. One limitation is lack of clear and continuous policies. The previous policy on industry did not emphasise on strict measures to control pollution which will derive from industry, agriculture and residential areas. The second limitation is lack of knowledge on pollution control technology. The other limitation is lack of awareness among the people about the pollution and destruction of natural resources.

8.9 The Government of Thailand has announced the 4th of December of every year to be the National Environment Day.

8.10 Since problems on environment in Thailand have become serious, either government or private organisation have to undertake various activities in order to conserve natural resources and environment.

8.11 Reafforestation in Northeast Land Settlement Cooperatives: Cooperative Promotion Department has promoted reafforestation in four land settlement cooperatives in the Northeastern Provinces. Bamboo trees will be planted in idle public land of 4,500 rai (720 ha) with the purposes to increase forest area, improve land fertility and also provide income to the members, and the members must be responsible for bamboo cultivation. The project was started in 1989 and up to present 40% of the area has been reforested.

8.12 Planting of Fruit trees in Northeast Land Settlement Cooperatives: The project is operated in land settlement cooperatives in six provinces with an operational area of 6,300 rai (1,000 ha), the cooperatives shall provide fund for cost of cultivation, the members can grow trees on their own land. Since 1989 up to present 5,530 rai has been planted with cashew nut, tamarine, bamboo, mango and other tree crops. The objective of the project is to encourage cooperative members to make their own area green and fertile and to earn from these trees.

8.13 One Million Tree Planting: The Cooperative Promotion Department has pursuaded all cooperatives and cooperative promotion offices to plant one million trees in the idle land. The objectives of the project are to create consciousness in forest conservation and tree value among the cooperative members and all people. The project was completed in 1991 with three million trees planted.

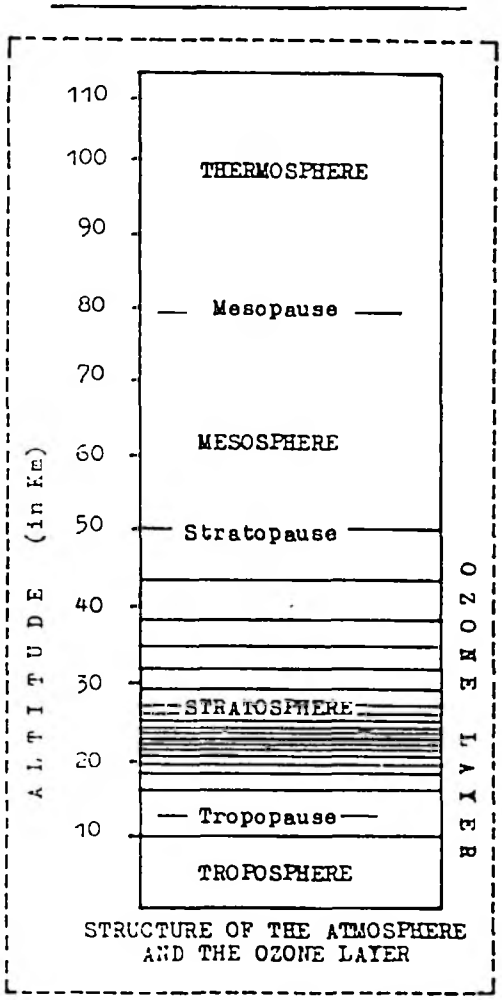
8.14 Teak growing promotion in Cooperative area: Teak is a valuable wood of Thailand but the member of teak trees cut down is much higher than teak growing. Hence, teak growing needs to be promoted so as to increase teak forest. The Tron Agricultural Cooperative Ltd. in Uttardir province has promoted teak growing project with the objectives to increase forest area of the country and to create source of income for the members.

8.15 The cooperative has targeted to grow 150,000 teak trees in 750 rai (140 ha) by 308 members. The project was started in 1987 and now teak has been grown in the area of 30 ha.

8.16 Rural Electricity Cooperative Ltd: The cooperatives will be organised in the area where water sources are available and can be developed for generating electricity. Therefore, the villages in hilly area of the North were selected to start the project of electricity generation by water power. Major benefit derived from the project besides electricity is the consciousness of rural people in protecting forest, because they have realised that forest will build up watershed which will be generating electricity for them. The people will have the sense of preserving forest, because they will be implanting the idea of "No Trees, No Water and No Electricity".

8.17 At present, there are 29 Rural Electricity Cooperatives in Chiangmai and Chiangrai provinces.

8.18 The Cooperative League of Thailand and the Cooperative Promotion Department will work jointly in providing Knowledge on conservation of natural resources and environment to cooperative members and soon the cooperative institution will become the leader of the community in protecting the environment and natural resources.



STRUCTURE OF THE ATMOSPHERE AND THE OZONE LAYER

"The Earth has become hopelessly ill while we have enjoyed, over the last 20 years, the benefits of economic prosperity. We think that something must be done about the situation because we cannot pass an ailing Earth on to the next generation.

"There are many things which we can do alone as well as together. Either way, we should start where we can.

"At the same time, I believe that parents must stress to their children the need to reduce the level of waste, how to avoid causing environmental pollution and how to recycle waste".

Nobuko Saito
in Speaking Out - Realistic Approaches to Environmental Issues

9. STRATEGY TO BOOST COOPERATIVES' INVOLVEMENT IN ENVIRONMENT PROTECTION

Keeping in view the present state of environment in the Region, and taking into consideration the efforts made by cooperatives in overcoming the environment-related problems, and upon analysing the various development efforts that are needed to be made by cooperative organisations and the concerned government departments, the Study suggests that the following points are relevant to develop a suitable strategy to boost cooperatives' involvement in environment protection:

9.1 Great emphasis is needed on creation of awareness among cooperative populace on all issues relating to environment protection.

9.2 Great need is felt to create and develop suitable and effective awaness programmes, materials and publicity campaigns.

9.3 Environment-related topics to be included in cooperative education and training programmes.

9.4 Cooperative federations to carry out awareness programmes for their affiliates and their ultimate basic members.

9.5 Cooperatives engaged in production and distribution sectors to ensure the safety and quality of goods handled by them.

9.6 Cooperatives to remember "Energy saved is energy generated" and "There is great wealth burried under the garbage" thereby providing momentum to waste resource recycling.

9.7 Cooperative Movements having experience and resources in the sector of environment protection to come forward to help, support and collaborate with sister-movements through expertise, exchange of information and financial resources.

9.8 Cooperative Movements to set up an international environment unit within the ICA - an international cooperative network - to channel technical assistance, information and further interaction with member-movement.

9.9 Cooperative Movements to set up an international environment fund and contribute to it liberally. The fund may support training, education, research and development activities.

9.10 Cooperatives to collaborate with respective national governments in the sector of environment and sustainable cooperative development.

10. REGIONAL WORKSHOP - A COMPONENT OF THE STUDY

The Jakarta Workshop

10.1 Before finalizing the regional documentation it was considered appropriate that all the national consultants get together to critically examine their findings and enrich the regional material. It was in this context that a regional workshop on "Environment and Sustainable Cooperative Development" was organised by the ICA ROAP in collaboration with the National Cooperative Council of Indonesia and the Department of Cooperatives, April 13-20, 1992 at Jakarta, Indonesia. The workshop was inaugurated by Hon'ble Bustanil Arifin SH, Minister of Cooperatives of Indonesia. The President of the Dekopin, Prof. Sri Edi Swasono, also addressed the workshop. A keynote address to the workshop was delivered by Hon'ble Prof. Dr. Emil Salim, Minister for Environment and Population Affairs of the Government of India.

10.2 In his keynote address, Minister Salim made the following points:

Imbalance of present-day echo-system is attributed to lop-sided economic and industrial development pattern. The developing nations also tend to follow the same methods and means of development as was done by the developed countries during the period 1900-1990. The development had resulted in the following:

- Earth warming up
- Rising sea levels
- Depletion of ozone layer
- Acid rains
- Climatic changes.

In case the new nations also keep on following the traditional methods of development the situation will aggravate further. This, however, does not mean that development should not take place. The development should take place since job opportunities for many have to be created and the economic system has to be strengthened to produce services for the people and industry. The development process should take into consideration two principal factors e.g., people and the environment. The development should be with environmental considerations. The development should be:

a. In a sustained manner,
b. On the principle of equity,
c. Respecting the aspirations of the people,
d. Enlisting international cooperation and collaboration, and
e. Development with environment considerations.

Deterioration of climate hits the poor most. Any increase in population brings pressure on all aspects of life and services. Services are provided depending on the capacity and resources available. The

key to a sustained development is the family welfare and the size of the family. The following are the factors of sustainable development:

- Self-reliance
- Bottom-up approach
- Multi-facet approach
- Decentralization.

The Principles of Cooperation need to integrated the concept of sustainability. In the entire process of development - economic or industrial - it is the man that matters and the freedom with which he operates. His initiative has to be made use of.

Looking around the global environmental situation, we hear often that pollution levels have already crossed the threshold levels and all should work to keep that level within a reasonable limit so that humanity could breath and live in healthy surroundings. We have already reached the threshold level and it should not go above that level. This level has to be stabilized and gradually brought down by the application of remedial means, methods and techniques. Local innovations have to be made. Use of known technologies has to be made. International cooperation and collaboration has to be enlisted.

There are four principal kinds of pollution:

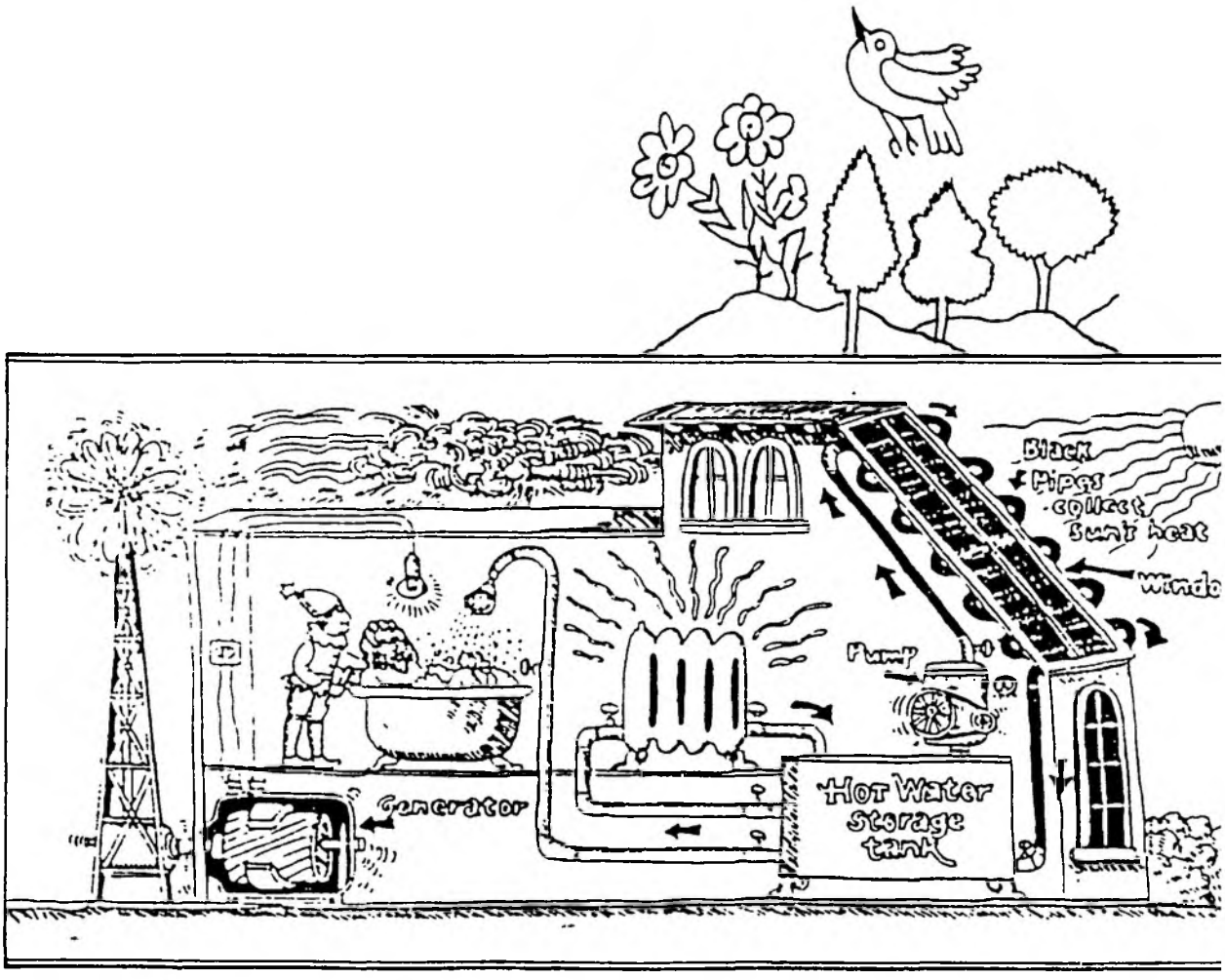
1. Air pollution
2. Water pollution
3. soil pollution
4. Noise pollution

Conservation of energy is an important item. Alternative means of energy have to be developed and applied. Gas emissions (greenhouse effects) have to be controlled. Cooperative institutions, as self-help groups of people can contribute significantly to reduce the environmental pollutions by making necessary adjustments in their means of production, distribution and processing. Cooperatives can introduce better techniques in their processing units and farm practices. Cooperatives can educate their members and the people at large on the ill-effects of pollution by developing and suitably improving their member education training and extension programmes. They can contribute significantly on the regreening of earth.

10.3 The workshop was attended by the following :-

01. Dr. G.C. Shrotriya (India), Regional Consultant
02. Mr. J.K. Lumunon (Indonesia)
03. Ms. Margaret Mockler (Consultant-Indonesia)
04. Mr. Zaim Saidi (Indonesia)
05. Dr. Saleh Syafradji (Indonesia)

06. Mr. Kazuo Tsukada (Japan)
07. Judge Manuel F. Verzosa (Philippines)
08. Col. Surin Cholpresard (Thailand)
09. Mr. Ian Macpherson (CCA-Indonesia)
10. Mr. Thomas Walsh (CCA-Indonesia)
11. Mr. Meth. Kusumahadi (Consultant-Indonesia)
12. Mr. Daman Prakash (ICA ROAP Regional Advisor)



11. WORKSHOP RECOMMENDATIONS

Suggested Regional Plan of Action

11.1 Based on the information compiled by them, the participants were of the view, that cooperative institutions and the cooperative members are generally unaware of the ill-effects of pollution. Much of the environment degradation is the result of lack of awareness. Members and cooperative institutions considered the environment matters to be the responsibilities of the State. However, some of the cooperative institutions in the covered countries demonstrated beyond doubt that cooperative institutions are aware of the consequences of imbalance in eco-system and that they have taken remedial steps to ensure that the products they produce and market are pollution-free and environment-friendly. The Workshop noted that some of the general environment problems faced by cooperatives in the covered countries are: Fertiliser and pesticides over-use or misuse; animal waste disposal; land degradation; and excessive urbanisation at the cost of agricultural lands and green cover.

11.2 The Workshop was firmly of the opinion that cooperative organisations in the Region should undertake, on a priority basis, intensive awareness campaign among the cooperative populace "to continue the battle to protect the environment, by supporting their societies' environmental campaigns and sustainable development programmes, lobbying local governments to adopt environment-friendly policies, boycotting products which are harmful to the environment, recycling reusable items and informing themselves and educating their children about nutrition and the environment". The Workshop impressed upon the International Cooperative Alliance to interact with its member-organisations intensively and as frequently as possible. If the world's environment is to be truly protected we need a massive programme of wealth transfer from the rich to the poor, the establishment of a more equitable global economic equilibrium and the most strenuous efforts to ensure that the world's population does not exceed the numbers that it can healthily contain.

11.3 At the end of the Workshop, a Regional Plan of Action was developed. Given below are the points made by the Workshop on this subject:

01. The International Cooperative Alliance Regional Office for Asia and the Pacific (ICA ROAP) to help its member-organisations and the respective governments in setting up policies and programmes aimed at enhancing awareness on environment-related problems among the cooperative membership in the Region. This is to be achieved by influencing the decision-making process among the cooperative organisations and through them the respective government agencies and departments.

02. The ICA ROAP to offer cooperation, collaboration and technical support to ICA member-organisations in carrying out the needed studies and workshops which are able to crystalize national action

plans, and identify feasibly projects for implementation in the sector of environment.

03. The ICA ROAP to study and analyse the identified projects and float them for funding among the interested donor agencies and provide the needed coordination and collaborative support.

04. The ICA ROAP may give publicity to the practice of "eco-labelling" the products which has been introduced by some of the cooperative organisations. The ICA may assist the cooperative organisations in establishing norms which could qualify a product to receive an eco-mark or eco-labelling.

05. The ICA may provide opportunities and facilities to cooperative institutions in the Region to vigorously pursue the programmes of recycling of waste resources and help in the transfer of the needed expertise and technology.

06. The ICA ROAP in collaboration with its member-organisations set up an Environment-related clearing house and Experience sharing service and procure, produce and issue success stories, news and other informatory material among cooperatives and governments in the Region for a wider circulation.

07. The ICA to initiate steps to set up an Environment Unit/Environment Fund to support environment-related education, training and research activities.

08. Environment-related matters be suitably included in all technical projects of the ICA ROAP.

09. The ICA ROAP to pursue closely the follow-up of the study and encourage its member-organisations to conduct follow-up activities and development of national plans of action.

10. The ICA ROAP to support and participate in the activities of international and national agencies which deal with environment and which have close relationship with cooperatives.

11. The ICA ROAP to collaborate actively with the ICA Congress Organising Committee in the formulation of the ICA Declaration on Environment proposed to be issued in Tokyo by the 30th Congress of the International Cooperative Alliance. The ICA ROAP to give widest possible publicity to the ICA Declaration and formulate the needed plans and programmes to implement the Declaration.

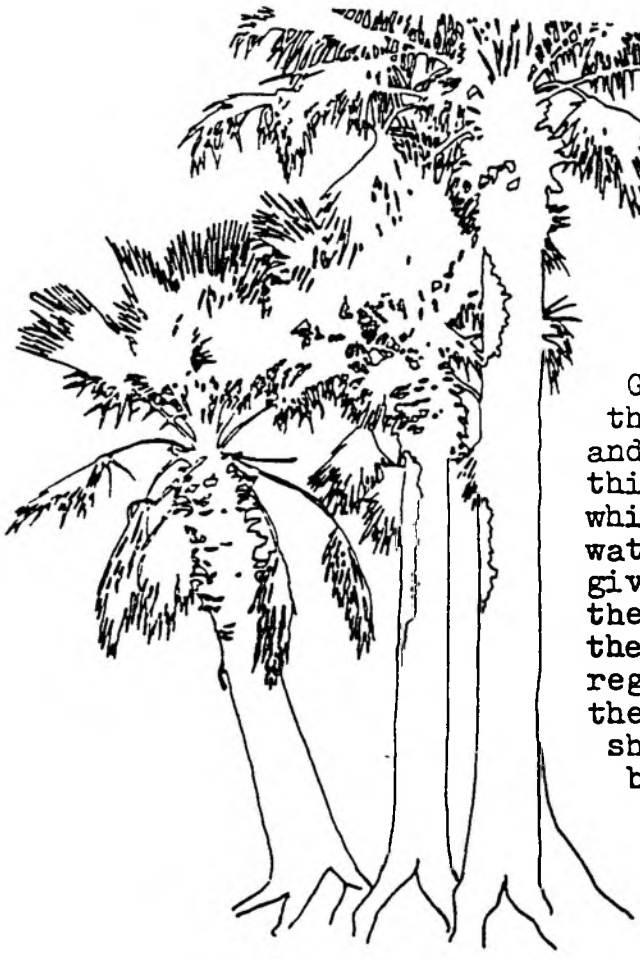
12. In all the activities of the ICA ROAP it should be ensured that the development of cooperative institutions in the Region is sustainable. For this purpose a multi-facet development approach is needed. Environment-related issued are closely hinged on the population activities, judicious land use, environment-friendly farm practices,

safe and healthy consumer articles and an objective educational and training programme. The ICA should aim at helping the cooperative organisations to develop an integrated programme of development, taking into consideration the issues relating to environment protection.

13. The ICA ROAP strongly recommends to its member-organisations to include environment-related topics in their education, training and extension programmes so that a well-informed and well-motivated cadre of environmentalists is quickly created.

14. The ICA ROAP may request all its member-organisations to take up environment-related topics at their Board meetings in order to create and generate interest among their affiliates. The member-organisations may also be requested to establish Environment Units within their structures to monitor programmes in this sector.

15. The ICA ROAP to encourage its member-organisations to coordinate their programmes with the respective departments of their respective national governments so that well-coordinated programmes are initiated and carried out.



Green cover is the product of clay and water. It is this green cover which generates water which in turn gives life to the clay to help the process of regeneration. It is the cycle which should go on. Any break in it spells disaster.Keep the earth green.'

12. STEPS TO CARRY OUT FOLLOW-UP ACTIVITIES AT THE NATIONAL LEVEL

12.1 The study identified some assignments for the cooperative organisations, government agencies and other agencies involved in the process of cooperative development. It has been highlighted that environment awareness is not one factor, rather it is an integral part of the entire process of cooperative development. The following assignments were laid down by the study:

What Needs to be Done

12.2 First and foremost is the creation of a national environment protection policy for the cooperative sector. To do this it is absolutely necessary that a national consultation on this topic takes place. This is a logical sequence of identifying the present status, analysis of the present status, identifying problem areas, and then getting together to develop strategies to overcome problems and then develop plans of action for local, regional and national implementation. This is the most important task for the Cooperative Movement. It is the need of the hour and an absolute must.

(a) Cooperative Movement Level Assignments

- All national level cooperative organisations should review their member education, employees' training and development programmes carefully keeping the environment factor in view and from the standpoint of a sustainable cooperative development. If they own processing units, necessary steps should be taken to control pollution and encourage greenery projects.

- Intensive publicity and propaganda campaigns should be launched to generate awareness among the constituents.

- In large office complexes owned by cooperatives special campaigns should be launched to keep them clean, fresh and environment-friendly e.g., cross ventilation, natural lighting, toilets, office rooms, disposal of garbage, cooking areas, proper use of electricity, use of recycled paper, avoiding unnecessary paper work, smoke-free environment, store rooms, godowns, etc.

- Organisations using a large number of vehicles and operating diesel/petrol driven machines should see to it that the engines are properly tuned, well-oiled and properly maintained that they do not emit gases, heat and unwanted noise. Also ensure that the oils and lubricants are not spilled on the ground and/or disposed off in pits outside the town.

- All cooperatives having large compounds should have a tree planting campaign.

- Cooperatives dealing in chemical fertilizers and farm chemicals should ensure that they are properly stored, transported, checked and maintained. Proper education on their handling and application is imparted to the dealers and end-users. Disposal of empties is also equally important. This responsibility is also that of the distributor of such materials.

- All cooperatives dealing with the community should support the community life by providing street-lighting, drinking water facilities, normal public health checks and ensure that the waste water from the community does not create sanitation problems. Streets may have to be lined. Cooperatives should participate together with the local government in community development activities.

- Experiments carried out by progressive organisations in environment protection should be given widest possible publicity so that other cooperatives involved in dairying, sugar, textiles, leather etc. also get encouraged and develop suitable environment-friendly products and programmes for the community.

- Greater encouragement should be given to women and youth so that they involve themselves in environment-related activities.

- All national level cooperative organisations should create within their organisational structures an Environment Information Cell whose responsibility should be to collect information from their constituents in this sector. These cells should be the promotors and extension agencies in preserving environment. A similar unit should be created in all the Ministries responsible for cooperative development.

(b) Assignments for Training/Education Institutions

- All organisations concerned with cooperative education, training and extension should enrich their programmes and courses by including subjects relating to environment protection and ecology. It should be clearly understood that environment awareness is not an isolated topic, it is indeed a part of the whole subject.

- All such organisations should generate extension materials e.g., photographs, posters, booklets, video films, etc. to be used as information tools at various levels and in various languages.

- At the national level Cooperative Management Institute, a special programme for providing orientation in this sector for the senior level government and cooperative officials should be developed and vigorously pursued without much delay.

(c) Government Responsibilities

Although the government is already engaged in environment affairs at various levels, there is a need for the Cooperative Ministries and Departments to support, monitor and accelerate programmes relating to environment protection.

- The Central Ministry of Agriculture and Cooperation convenes a national level conference of cooperative ministers, senior officials, cooperative leaders and other prominent leaders and environmentalists to discuss and formulate a national policy on the subject with special reference to cooperatives. The government could provide encouragement and motivation for the cooperatives to participate in such a programme.

- If necessary, legal support be provided to cooperatives engaged in environment-related activities.

- The government could encourage, promote and support some of the pilot projects in this sector and, if found successful, be replicated for other parts of the country.

Roles Cooperatives Can Play

12.3 Cooperative institutions as peoples' organisations can play a significant role in creating awareness among the people. These could be:

- Creating awareness among cooperatives and cooperative members through extension programmes and publicity campaigns. Environment protection is an integral part of the entire process of cooperative development.

- Developing educational and training programmes for board members and staff members.

- Cooperating with government agencies in suggesting new measures and implementing environment-related programmes.

- Giving publicity to environment-related successful measures taken by cooperatives.

- Collaborating with cooperatives abroad in exchanging information, techniques and expertise.

12.4 Cooperatives can undertake the following principal activities:

- Creating awareness among the people on the consequences of increase in population. Special programmes on population control can be undertaken by cooperatives in collaboration with government concerned agencies.

- Creating awareness among the people on the consequences of cutting down trees indiscriminately.

- Creating awareness among the people on the consequences of flow of waste water in village streets.

- Creating awareness among the people on indiscriminate mining and digging up soil for brick-klins etc.

- Educating farmers on the use and handling of chemical fertilizers, insecticides and pesticides e.g. DDT.

- Educating people on the importance of washing vegetables and fruits before consuming them.

- Informing people on the use of alternative sources of energy for cooking, heating and lighting. Included also is the increasing use of bio-gas for domestic use.

- Encouraging people to develop social forestry programmes.

- Encouraging people to participate in community development programmes e.g., rural sanitation, cleaning of school premises, cleaning of village streets, repairing of leaking water taps, discussions with the nearby factories or mills, developing modest rural health programmes, better management and regreening of wasteland etc.

12.5 The main emphasis of cooperative extension activities should really focus on: population control, stopping the rural youth from moving away from the rural areas to the cities (perhaps due to lack of employment opportunities in the villages, and also perhaps due to the lack of vocational training opportunities in the villages), soil erosion, tree planting, education of members, and making the cooperative as an economic centre of the village.

12.6 While national awareness planning and action plan is necessary, a real work could be done at the basic level. Cooperative institutions can interact strongly with the rural local self-government agencies in order to develop an integrated environment development strategy. This would involve awareness, extension, training development activities. A strong well-informed and properly trained cadre of environment-conscious "missionary" workers has to be developed who could provide, on a regular basis, education and information on various aspects e.g., rural/ general sanitation, farm guidance, hygiene warehousing and handling of products, afforestation, water testing, soil testing, systematic handling of chemicals and fertilizers, disposal of garbage, recycling of waste material, setting up of bio-gas plants, family welfare and child care etc. etc. The national and provincial cooperative (business) organisations can formulate strategies, develop and provide back-up services e.g., curricula, trainers' training and extension of field material, training packages, handbooks, and also identify, secure and provide proper funding for implementation

of programmes. Vocational training facilities for rural youth should also be created e.g., repairing of household items, cycles, motor cycles, electrical items, welding, carpentry etc.

12.7 Simple, attractive and well-researched material may also be produced by concerned agencies and widely distributed. Some of the topics could be:

- Environment protection and diary cooperatives;
- Environment protection and the industrial cooperatives;
- Environment protection and leather cooperatives;
- Environment protection and sugar cooperatives;
- Environment protection and textile cooperatives;
- Environment protection and fertiliser cooperatives;
- Environment protection and warehousing;
- Environment protection and consumer cooperatives;
- Environment and you;
- Environment and Tree Growers' Cooperatives;
- Environment and Transport Cooperatives; and
- Use of solar/bio-gas as energy.

Follow-up Guidelines

12.8 The Workshop suggested that national organisations in the Region carry out intensive follow-up activities. These can be in the form of a national workshop or a national situation study. The Workshop suggested the following guidelines:

01. Constitution of a national organising group consisting of representatives of government, national level cooperative federations and selected large-size production, processing and consumer cooperative organisations, including agencies responsible for cooperative education, training and extension programmes.

02. Define objectives and outline activities and methodology to achieve the set objectives.

03. Setting up a timetable for holding a national follow-up study or workshop to achieve the set objectives.

04. Appoint a coordinator and assign responsibilities and budget etc.

05. Identify target group, participants and invite them formally to participate in the follow-up activity. Identify also if any external collaboration/assistance is needed.

06. Invite technical situation papers from selected sectors who can contribute their experience.

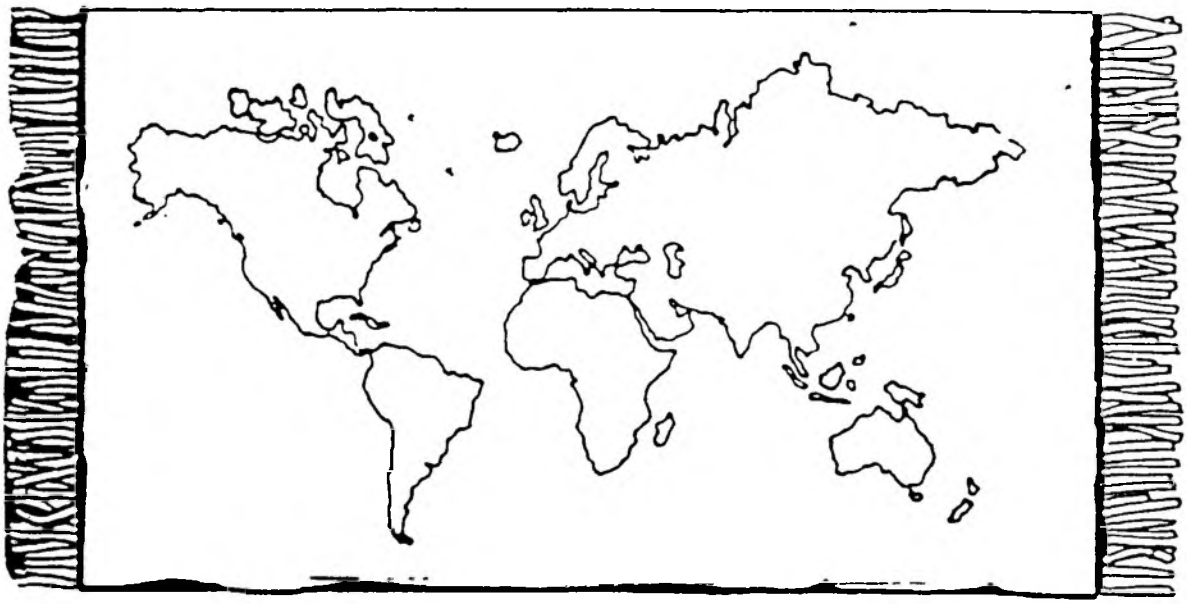
07. Statement of policies and programmes. Suggest if any improvements needed.

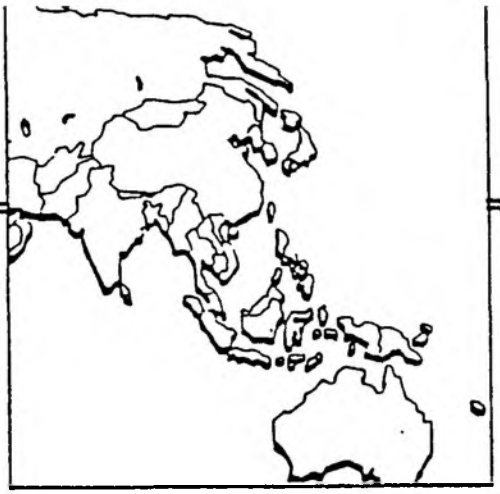
08. Suggested contents of the situation papers:

- General information on the sector
- Problem areas faced by the sector
- Causes of problem areas
- Steps already/proposed to be undertaken to solve problems
- Detailed information on action initiated
- Problems encountered in solving problems
- Suggested solutions/Action Plan
- Specify assistance/collaboration needed
- Identification of feasible projects
- General recommendations

09 Develop a national plan of action and identify projects.

10. Prepare and issue national follow-up report to respective agencies for implementation.





The International Cooperative Alliance is one of the oldest non-governmental international organisations. It is a worldwide confederation of cooperative organisations of all types. Founded in London on 18th August 1895, the ICA has affiliates in 77 countries with 195 national and ten international level cooperative organisations as members serving over 648 million individual members at the primary level. The ICA is the only international organisation entirely and exclusively dedicated to the promotion of Cooperation in all parts of the world. The ICA holds Consultative Status of Category-I in the United Nations Economic and Social Council (UN/ECOSOC).

Besides the head office in Geneva, Switzerland, there are four regional offices viz. the Regional Office for Asia and the Pacific in New Delhi, India (established in 1960); the Regional Office for East, Central and Southern Africa at Moshi, Tanzania (established in 1968); the Regional Office for West Africa at Abidjan, Ivory Coast (established in 1979) and the Regional Office for Central America and the Caribbeans at San Jose, Costa Rica (established in 1989).

The ICA Regional Office for Asia and the Pacific (ICA ROAP) serves 54 national level organisations from 19 countries, representing nearly 440 million individual cooperators. These countries are : Afghanistan, Australia, Bangladesh, China, Fiji, India, Indonesia, Iran, Japan, Democratic Republic of Korea, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, USSR and Vietnam.

Main activities of the ROAP include coordination of cooperative development efforts within the region and promotion of exchanges and experiences; project identification, formulation and evaluation; promotion of establishment and development of national cooperative apex organisations; and organisation of seminars and conferences on specific subjects including support for programmes aiming at the involvement of women and youth in cooperative activities.

Finances are derived from member subscriptions, own funds and assistance from donors for various activities carried out by the ICA.

INTERNATIONAL CO-OPERATIVE ALLIANCE
Regional Office for Asia & the Pacific," Bonow House," 43 Friends Colony (East)
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Subject II Environment Management in India—Policies and Programmes.

Present Status of Environment Management in India —Policies and Programmes

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Environmental Management Awareness

Increasing population and various developmental activities pose threat to the environment and urgent remedial measures are now required for restoring the environment and maintaining ecological balance. Environmental management is accepted as a major guiding factor for national development. Over the last decades there has been progressive strengthening of official involvement in environmental management with increased scientific, technical, administrative and legislative backup at the Centre and State levels.

Another class of environmental problems faced is the unintended side-effects of the very attempts at development. These are : mismanagement of natural resources, large-scale deforestation, unplanned discharge of residues and wastes, handling of Toxic chemicals, indiscriminate construction, expansion of settlement activities etc. It is to this class of problems the tools and methodologies of environmental planning are primarily addressed. A committee on environmental coordination was set up in 1972 to look into these problems and suggest solution in consultation with experts and concerned ministries/departments of the Government. Another committee was set up in January 1980 for reviewing exhaustive legislative measures, administrative machinery for ensuring environmental promotion and for recommending ways to strengthen them. On the recommendations of this high-powered committee, Department of Environment was set up in 1980. Subsequently it was made a new Ministry of Environment,. Forests and Wild Life in 1985 to serve as the focal point in administrative structure for planning promotion and coordination of environmental programmes.

Constitutional Provisions

In India the problems of environment management were given a serious thought by a few environmentalists and the then Prime Minister, Mrs. Indira Gandhi. In 1972, she attended the United Nations Conference on Human Environment at Stockholm. In 1976 the Constitution (Fortysecond Amendment) Act was passed, incorporating provisions to protect environment and safeguard against pollution. The problem of environmental pollution was highlighted through inclusion of Article 48-A in the Chapter on Directive Principles of State Policy which runs as follows :

"48A. Protection and Improvement of Environment and Safeguarding of Forests and Wild Life—The State shall endeavour to protect and improve the environment and to safeguard the forests and wild-life of the country."

The Constitution (Fortysecond Amendment) Act, 1976 provided in Section (ii) a new Part IV-A under the nomenclature "Fundamental Duties". It provides Article 51-A in which sub-cluse (g) is about duty of citizens in environment management and reads as under :

"It shall be the duty of every citizen of India..... to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures."

The effect of including these provisions in the Constitution of India has been instant. There has been a national awareness of the inherent danger in the further neglect of purity of environment.

The provisions contained in Part IV of the Constitution dealing with the Directive Principles are enforceable by any court, but the principles therein laid down are, however, fundamental in the governance of the State. It shall, therefore, be the duty of the State to apply these principles in making laws. The Supreme Court of India has conferred varying degrees of respectability to the Directive Principles from time to time.

Environment (Protection) Act, 1986

This Act has been brought into force from 19 November 1986, its salient features are : (A) conferring powers on Central Government to : (i) take all necessary measures for protecting quality of environment; (ii) coordinate actions of States, officers and other authorities under this Act; (iii) plan and execute a nationwide programme for prevention, control and abatement of environmental pollution; (iv) lay down standards for discharge of environmental pollutants; (v) empower any person to enter, inspect, take samples and test; (vi) establish or recognize environmental laboratories; (vii) appoint or recognize government analysts; (viii) lay down standards for quality of environment; (ix) restrict areas in which any industries, operations or processes may not be carried out or shall be carried out subject to certain safeguards; (x) lay down safeguards for prevention of accidents and take remedial measures in case of such accidents; (xi) lay down procedures and safeguards for handling hazardous substances; (xii) constitute an authority or authorities for exercising powers; (xiii) issue directions to any person, officer or authority including the power to direct closure, prohibition or regulation of any industry, operation or process or stoppage or regulation of supply of electricity, water or any other service; (xiv) require any person, officer, state government or authority to furnish any prescribed information; and (xv) delegate powers to any officer of a state or authority; (B) it confers powers on persons to complain to courts regarding violation of the provisions of the Act, after a notice of 60 days to prescribed authorities; (C) the Act makes it obligatory for the person in-charge of a place to inform the prescribed authorities regarding any accidental discharge or apprehend discharge of any pollutant in excess of prescribed standards. Authorities, on receipt of such information or otherwise, shall take remedial measures to prevent or mitigate pollution caused by such accidents and expenses incurred by the authorities in respect of remedial measures are recoverable with interest from the polluter; (D) it prescribes stringent penalties for violation of the provisions of the Act. No distinction is shown between government departments and other companies, and (E) jurisdiction of civil courts is barred under the Act.

Government has taken several steps to provide legal and institutional basis for implementation of the Act. These include issue of rules, notification of standards action regarding environmental labouratories, strengthening of state departments of environment and pollution control boards, delegation of powers, identification of agencies for carrying out various activities for hazardous chemical management and setting up of environment protection councils in states.

Water Pollution

Though water is a State subject, except that the Central Government has the responsiblity of regulation and development of inter-state rivers and valleys to the extent to which such regulation and development declared by Parliament to be expedient in public interest, yet the Act is a central enactment. The Act has been enacted by Parliament under Article 252 of the Constitution which enables Parliament to pass an Act for any matter failing in the state list.

The Act being comprehensive covers various types of water. Its application is to streams which term includes rivers water course, island water, sub teranian water, sea or tidal water. The Act is the most comprehensive legislation to clean up the nation's waters.

There is a provision in the Act for establishment of a Central Board and State Boards for prevention and control of water pollution which are autonomous Boards in their working and powers.

Central Board has to coordinate the activities of the State Boards and resolve disputes among them, whereas the main function of the State Boards are : (i) to lay down standards of pollution; and (ii) to make consent order for putting trade and sewage effluents into the steams. The Central Board and State Boards have to

Act according to the directions of the Central Government and State Governments/Central Board respectively. In cases of divergence in directions given by the State Government and Central Board, the matter is to be referred to the Central Government for adjudication.

The main function of the Central Board is to coordinate the activities of the State Boards and thereby plan and execute a nationwide programme for prevention, control and abatement of water pollution. The State Boards, in turn will plan a comprehensive programme for the same purpose in their respective states. State Boards have to make surveys, maintain records of flow on volume of any stream or well or discharging sewage or trade effluent into-them.

The objective of this legislation is to prevent and control water polluton and also to maintain and restore the wholesomeness of water. As an existing industry cannot be asked to abruptly stop its discharge into a water course, therefore, in respect of the existing sources of pollution, the remedy lies in a gradual control of pollution, for which a special provision has been made in the Act, which permits the existing industries, discharging effluents in the water course to apply for consent within three months of the establishment of State Boards. So far as new industries are concerned, standards can be laid down and enforced strictly, with a view to making systematic arrangements for the treatment of effluents in accordance with the requisite standards before they are discharged in the water course. There is also a provision in the Act which lays down that no person can bring into use any new or altered outlet for the discharge of sewage or trade effluents into a stream or well without the previous consent of the State Board.

Section 277 of Indian Penal Code (IPC) provides whoever voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render lessfit for the purpose for which it ordinarily used, shall be punished with imprisonment of either description for a term which may extend to three months, or with fine which may extend to five hundred rupees, or with both.

The aforesaid provision is extremely limited in scope. this applies to a public spring or reservoir. There is a Section 269 IPC which prescribes punishment for negligent act likely to spread infection of any disease dangerous to life. Pollution of water other than springs and reservoirs will be covered by Section 290 of the Indian Penal Code. Another provision in the IPC relevant to water is Section 426 which deals with mischief.

The Municipal enactments also contain provisions dealing with water pollution. The Delhi Municipal Corporation Act 1975 is one of such enactments, which empowers the commissioner to make an order restraining the use of water from any well tank or any other source of supply not vested in the Corporation when it is so polluted as to the prejudicial to health of the people.

Prevention and Control of Water Pollution

Central Pollution Control Board (CPCB) is the national apex body for assessment, monitoring and control of water and air pollution. Executive responsibilities for enforcement of the Acts for prevention and control of pollution of water (1974) and air (1981) as also of the Water Cess Act (1977) are carried out through the Board and similar statutory boards established in the states under these Acts. Except Manipur, Nagaland, Sikkim, Arunachal Pradesh and Mizoram all states have constituted their boards. Central Board also looks after pollution control activities in union territories except Lakshadweep

After enactment of the Environment (Prevention) Act, 1986 major additional responsibilities have been placed on Central and state boards. Under the Act, effluent and emission standards in respect of 31 specific industries have been notified which are applicable to all types of effluents generated from industries including municipal sewage. This excludes industries for which standards have already been notified. So far 83 laboratories have been recognized as environmental laboratories. Minimal National Standards (MINAS) for pollution discharge from specific industries have been formulated and control measures are being implemented in a phased manner.

CPCB is also engaged in the study of existing surface water quality under the programme "Monitoring of Indian National Aquatic Resources" (MINAR) including stations of the Global Environmental Monitoring System (GEMS/Water). There are altogether 400 water quality monitoring stations. The Board has also a programme on monitoring of ambient air quality under National Ambient Air Quality Monitoring Programme. At present, 120 air quality monitoring stations are in operation.

Air Pollution

To begin with air pollution was indirectly controlled by various enactments made by Central Government and State Governments. Therefore, there arose a need to introduce a comprehensive legislation with the sole object to deal with air pollution. Indian Government enacted the Air (Prevention and Control of Pollution) Act, 1981. This Act was passed under Article 253 of the Indian Constitution to implement the decisions reached at the 1972 Stockholm Conference, in so far as they relate to the prevention of the quality of air and control of air pollution to which India is party.

This Act under Section 2 defines air pollution as the presence of any solid, liquid or gaseous substances present in the atmosphere in such concentration as may be or tend to the injurious to human beings or other living creatures of plants or property or environment. Pollution damages not only the health of the individuals, it rather affects the entire social fibre and leaves its unbridgeable impacts.

The Act provides for setting up of Air Pollution Control Boards at the Centre as well as in the States with power to issue and revoke licenses of polluting industries, enforce emission standards and to frame rules and regulations for the control of air pollution. The Act envisages an integrated approach for tackling the environment pollution problems by laying down that the Central Board and State Boards for the Prevention and Control of Water Pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974 shall also perform the functions of the Central Board as well as the State Board for the Prevention and Control of Air Pollution.

Moreover, certain heavily polluted regions may be declared as "air pollution control areas" by the State Government, after consultation with the State Board were any further pollution by the use of any fuel would become a severe health hazard to the people. Similarly the use of any appliance can be prohibited in the premises situated in such control areas. The burning of any material (other than fuel) like garbage and other waste products in such area which is likely to cause air pollution can be prohibited by the State Government. It also prohibits the fouling up of the air by burning smoking fuels for domestic purposes.

The State Government in consultation with the State Board has power to give instructions to the concerned authority in charge of registration of motor vehicles under the Motor Vehicles Act, 1939 for ensuring standards for emission from automobiles and such authority is bound to comply with such instructions. No industrial plant shall be operated in an 'air pollution control area by any persons without the previous consent of the State Board.

There are stringent measures to check hazardous pollution.

Noise Pollution

Noise Pollution has been described as a sound without agreeable musical quality, or an unwanted or undesired sound. The definition given in ILO Convention No 148 is :

"the term noise covers all sound which can result in hearing impairment or be harmful to health or otherwise dangerous".

The major sources of noise pollution include industry, transport and community activities. When the sound level in the working environment is more than 90d B and there is difficulty to communicate by speech.

Legal Regulation of Noise Pollution

In India, there is no law exclusively dealing with the problem of noise pollution. There are some stray provisions here and there in different laws which are discussed below :

(a) Noise Control under Law of Torts : A civil suit can be filed claiming damages for the nuisance. Nuisance as a tort means an unlawful interference with a person's use of enjoyment of land, or some right over, or in connection with it. Therefore, it is duty of every neighbour or a person living in that locality not to make any unreasonable noise in order to allow neighbours to live in peace. No person has absolute right to make noise on his land to the detriment of others and the person makes noise which disturbs his neighbour, the neighbour can file a case for the tort of nuisance. But it is clear that the law of torts can be used as an instrument to control the noise pollution but the field of its application is very small and narrow.

(b) Noise Control under Law of Crimes : Section 268 of the Indian Penal Code recognizes noise as public nuisance. Section 268 reads :

A person is guilty of a public nuisance who does not act or is guilty of an illegal omission which causes any common injury, danger, or annoyance to the public or to the people in general who dwell or occupy property in the vicinity, or which must necessarily causes injury, obstruction, danger or annoyance to persons who have occasion to use public right.

Nuisance by noise in India is not considered as seriously as it should be. This can be attributed to many factors. Firstly, there are very prosecutions for nuisance by noise. Secondly the offence of public nuisance u/s 290 IPC is non-cognizable. Thirdly, the nuisance by noise is not regarded as public nuisance by the courts on the ground that it does not affect all the residents of a locality. Fourthly, the courts easily accept the defence of enjoyment of his right of property by the accused which he asserts as his basic human right. Fifthly, the judges are, generally, unaware of the health hazards of unbearable noise. Sixthly, nuisance by noise is taken by the courts as too insignificant to be taken notice of under the IPC. Seventhly, the people in India are neither conscious of their rights nor aware of the relevant provisions of law for the enforcement of the violations of the concerned rights. Eigthly, the absence of the provision of the sentence of imprisonment under section 290 discourages penal prosecution for nuisance by noise. Ninthly, the IPC was drafted when there were no such scientific and industrial developments and therefore, the IPC's drafters had no idea of such noise pollution by so many irritants of the modern society. Consequently, the provision of the IPC is inadequate to cope with increasing menace of noise pollution.

Noise Control under Motor Vehicles Act, 1939

This Act under sections 20, 21J, 41, 68, 68(I), 70, 90 and 111A empowers a State Government to frame rules for the upkeep of motor vehicles and control of noise produced by them in its jurisdiction. A close examination of motor vehicles rules made by various States reveals that there is nothing substantial to control the noise pollution except small control 'Horns' and 'Silencers' producing noise. So, the power conferred by this Act has not been fully utilized by governments towards making effective regulatory provisions to control noise pollution.

Noise Control under Industrial Laws

Surprisingly no industrial law has provided protection to the workers from the noise pollution except Secion II of Factories Act, 1948.

Afforestation

India is one of the few countries which had a forest policy since 1894. It was revised in 1952 and again in 1988. Main plank of the revised forest policy 1988 is protection, conservation and development of

forests. Its aim are : (i) maintenance of environmental stability through preservation and restoration of ecological balance; (ii) conservation of natural heritage; (iii) check on soil erosion and denudation in catchment area of rivers, lakes and reservoirs; (iv) check on extension of sand dunes in desert areas of Rajasthan and along coastal tracts; (v) substantial increase in forest/tree cover through massive afforestation and social forestry programmes; (vi) steps to meet requirements of fuel wood, fodder, minor forest produce and small timber of rural and tribal populations; (vii) increase in productivity of forests to meet national needs; (viii) encouragement of efficient utilization of forest produce and optimum substitution of wood, and (ix) steps to create massive people's movement with involvement of women to achieve objectives and minimize pressure on existing forests.

Forest Conservation

Increasing destruction and degradation of forests and treelands especially in the Himalaya and other hill areas, is leading to heavy erosion of top soil, erratic rainfall and recurring floods. It is also causing acute shortage of fire wood and, what is more important, loss of productivity due to eroded and degraded lands. The Forests (Conservation) Act, 1980, enacted primarily to check indiscriminate deforestation/diversion of forest lands for non-forestry purposes, was amended in 1988 to make it more stringent by prescribing punishment for violation. Rate of diversion came down to about 16,500 hectare a year after the enactment of this Act as compared to 1.5 lakh hectare per annum earlier.

Another area of concern has been degradation of forests due to biotic pressure. Guidelines have been framed for preparation of working plans and felling in forests. Some of the salient features are : (i) preliminary working plan should be up-to-date and stress conservation; (ii) preliminary working plan should have a multi-displinary approach; (iii) tribal rights and concessions should be highlighted along with control mechanisms; (iv) grazing should be studied in detail and specific prescriptions should cover fodder propagation; (v) clear-felling with artificial regeneration should be avoided as far as possible and clear-felling blocks should not exceed 10 hectare in hills and 25 hectare area in plains; and (vii) banning all felling above 1,000 meter altitude for a few years should be considered to allow these areas to recover. Critical areas in hills and catchment areas prone to landslips, erosion, etc., should be totally protected and quickly afforested.

Government has recently set up a National Forest Fund. Initially its funds will be used for unemployed youth, ex-servicemen, tribal, etc., for planting trees on users' lands.

National Wastelands Development Board

National Wastelands Development Board (NWDB) was established in May 1985 with primary objective of undertaking wastelands development. NWDB seeks to achieve this through a massive programme of afforestation and tree planting with people's participation. First four years of Seventh Plan saw coverage of 7.16 million hectare of land under it.

Besides providing impetus to on-going programmes such as rural fuelwood plantations, operation soil watch, decentralized nurseries etc., several new initiatives like seed development agencies, aerial seeding, margin money assistance to autonomous bodies/organisations, minor forest produce planting and fuelwood and fodder projects, were taken up in 1988-89. The NWDB now works under Ministry of Rural Development.

A review of the activities of the Board showed that there is need for restructuring and streigthening the programme. Recognizing this Government decided to raise wastelands development programmes tothe level of a technology mission and National Technology Mission on Wastelands Development was launced on 5 October, 1989.

The environmental issues were explicitly recognised from fourth Five Year Plan onwards. lowever, environmental planning in India started effecively from the Sixth Plan. The Eighth Five Year Plan ocument contains a separate chapter on 'Environment and Forest'. There is pointed reference to 'destrudon and degradation of forests' which has resulted in heavy toll of our soil and water resources.

Industrial Safety and Environment

Despite the Factories Act, 1948 and the licensing procedures framed under the Industries (Development and Regulation) Act, 1951, containing provisions for regulating the setting of industrial units from the point of view of environmental hazards, especially for the industries which emit poisonous and highly toxic gases, endeavoures at environmental protection—atmospheric as well as water—did not make much headway till about the middle of the last decade. An Expert Committee of ASSOCHAM set up in 1973 specifically to assess the situation reported after a survey that there was a definite lack of awareness of the environmental protection problem even among the constituents of ASSOCHAM. The position was no different, if not worse, in the case of the industrial sector in general. Most industrial units did not take any environmental protection measure. They even lacked monitoring facilities in this regard.

Statutory Provisions Relating to Industries

Besides the general provisions in the Factories and the Industries (Development and Regulation) Acts formalized procedures have now been evolved by the government for selected hazardous industries coming under the overview of the licensing system. According to this procedure, letters of intent can be converted into industrial licenses only if the following conditions are fulfilled :

- The State Director of Industries confirms that the site of the project has been approved from the environmental angle by the competent state authority;

- The entrepreneur commits, both to the State Government and the Central Government, that he will, install the appropriate equipment and implement the prescribed measures for the prevention and control of pollution;

- The concerned State Board of the Prevention and Control of Pollution has certified that the proposal meets with environmental requirements and that the equipments installed or proposed to be installed are adequate and appropriate to the requirements.

The Minimal National Standards (MINAS) for pollution discharges for specific industries have been formulated and control measures are being implemented.

In the wake of the Bhopal tragedy, caused by the leakage of poisonous gas in a pesticides manufacturing plant there, a policy paper for legislative and institutional framework to regulate the import, manufacture, handling and disposal of hazardous substances (Toxic chemicals and micro-organisms) has been prepared. A document recommending the threshold limit values (TLV) for selected hazardous industries for environmental purposes also has been prepared.

International Cooperation

The Ministry functions as nodal agency for UNEP, South-Asia Cooperative Environment Programme (SACEP), and International Centre for Integrated Mountains and Development (ICMOD). It is also the nodal for interaction with various international agencies, regional bodies and multilateral institutions. It coordinates all bilateral cooperation in the field of environment. India has such cooperation programmes with the Netherlands. Norway, Sweden, Denmark, Britain, USA, erstwhile USSR, Canada, Japan and Germany, in addition to social forestry programmes with external assistance.

In 1988, a move was initiated for studies of environmental degradation and natural disasters through SAARC. The Ministry is playing a coordinating role in deliberations on global warming, trans-boundary movement of hazardous chemicals and chemical wastes.

India is a signatory to World Heritage Convention and the Ministry deals with the natural sites inscribed in this Convention. India is a member of Convention on International Trade in Endangered Species.

International Whaling Commission. Antarctica Treaty and Convention on Migratory Species. It is also a party to a number of other international agreements for protection of flora and fauna.

India has acceded to the Montreal Protocol on the phaseout of Ozone Depleting substances (ODSs) on 19.6.92. This implies that the production and consumption of ODS such as various CFCs, methyl chloride, carbontetra chloride, halone etc. have to be phased out completely by the year 2010. The Protocol also provides for meeting some costs associated with phaseout in developing countries including India. Ministry of Environment and Forest have created an Ozone cell for monitoring this.

Monitoring

Government has constituted an Environmental Monitoring Committee with a view to ensuring effective implementation of environmental safeguards in irrigation, multi-purpose and flood control projects. Headed by Member (Water Planning), Central Water Commission, it has representatives of Ministries of Water Resources, Environment and Forests. Agriculture, Welfare, Planning Commission and Central Water Commission.

Whenever need arises, representatives of other national organisations are invited for discussions on any related specific issues. The committee will review mechanism established by project authorities to monitor ecology of project area, irrigation command areas and catchment areas and suggest additional compensatory measures/facilities whenever necessary.

Ecomark

The new scheme, due for implementation is to award 'ecomark' label to products which are friendly throughout their life cycle of manufacture, use and disposal. Environmental criteria, for each product category will be set by the government and thus market out to be Indian Standards by the Bureau of Indian Standards (BIS). Products eligible for the ecomark should be less polluting than other comparable products in production, usage and disposal. They should be made from material that can be recycled, made from recycled products or be biodegradable where comparable products are not. A significant contribution towards saving non-renewable resources, as well as effective use of waste products or reduction of waste generated are also ecomark criteria.

The scheme is purely voluntary. Manufacturers of products which comply with published criteria can apply for testing and certification of their products. The BIS will undertake this function. Terms and conditions governing the operation of Licenses, including fees, will follow the rules and procedures laid down by the BIS Act. The ecomark scheme will cover product categories ranging from soaps and detergents to food products, cosmetics, paints, packaging paper and many others. The scheme has the potential to create consumer awareness on environmental issues.

The criteria for the first product category, soaps and detergents, have been published in a gazette notification dated November 29, 1991.

Subject III Promotion of better living through Cooperatives

Promotion of Better Living Through Cooperatives

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Introduction

Involvement of Women in Cooperative Movement is of great significance as it would enable the Women to improve their socio-economic status as well as help in broadbasing and augmenting the membership of the cooperatives. In view of low literacy among women and lack of awareness, women have not been able to participate in the activities of the cooperatives. Hence in the case of women it is all the more necessary that they should be properly educated in the principles and practice of cooperation so that they can actively participate in the development of the cooperatives. Women Education Programme was started in the year 1966 as a pilot project in all the states on an experimental basis, as per the recommendations of an All India Seminar on "Women and Cooperatives" held at New Delhi in the year 1965.

Women Activities in Karnataka

In Karnataka also Women Education Programme was started in the year 1966 as a pilot project with four Lady Instructors in two districts of Dharwad and Bangalore. When the Programme was started hardly there were 50 Women Cooperative Societies out of which 20 were defunct. Now I am proud to say that there are more than 600 Women Cooperative Societies of various types exclusively managed by ladies. There is three tier system in Karnataka with Primary Societies, District level Women Multi-purpose Cooperative Societies and a State level Women Cooperative Federation, which has been established very recently during 1993. The broad objects of the Women Education Scheme are as given below :

- To expose members, non-members including housewives and students to the concept and principles of Cooperation.
- To acquaint the members to Cooperative Societies with their duties, rights, functions and their role in supporting the movement and the Societies.
- To educate the Managing Committee members with the procedure and practice of cooperation, Act, Rules and Bye-laws and business techniques to ensure proper management of cooperatives.
- To encourage the women to join cooperatives and to make use of their services.
- To encourage women of the area to organise Women Cooperative of their interest.
- To develop leadership qualities among women so that they can take a lead in raising the socio-economic and legal status of women.

In Karnataka at present 5 Lady Instructors are working in 5 districts in Bangalore City, Bangalore Rural, Mysore, Madikeri and Dharwad. These Instructors conduct women cooperative education classes at the convenient time and place of women in the area. The classes conducted are for Managing Committee members for 5 days, for ordinary members for 7 days, general cooperative women members for 5 days, for employees of women cooperatives for 7 days, for potential members for 7 days, for weaker sections for 2 days, for college students for 3 days and also Leadership Development Programme for 3 days, besides conducting District level Seminar. The Lady Instructors are also being trained once in a year to keep their knowledge updated. Now in view of the impact of Women Member Education Programme, we can find awareness among women and every women desires to be economically independent through cooperatives. They want the developmental programmes and not the welfare activities any more.

At the state level we are organising conferences, seminars, Leadership courses etc. for Women Cooperators and the participants are being selected out of the women who have participated in educational programmes at the district level.

Income Generating Scheme : With the initiative taken up by the Karnataka State Cooperative Federation it is glad to note that out of 20 Districts, District level Women Multipurpose Cooperative Societies have been formed in 19 districts and in few districts these Women Societies have already started marketing activities.

Our main objects is to market the products of our Women Cooperatives and to expose the products to the bulk purchasers. In these district level Women Societies income generating programmes have been introduced to give employment opportunities to widows, disabled etc.

The District Women Multipurpose Cooperative Societies have been provided representation in the Board from the taluk level. The Board is elected by the general body and the Board elects the office-bearers.

As stated earlier, a state level Women Cooperative Federation viz., The Karnataka State Women Cooperative Federation Ltd. has been formed in Karnataka in 1993. The District Women Multipurpose Cooperative Societies, the Women Societies which have the jurisdiction of more than a taluk and less than a District are the members of the Federation.

The main object of this Federation is to assist the women cooperative societies in accordance with the principles of cooperation. The objects include undertaking marketing activities, import and export, to start technical wing, publicity, to conduct seminars etc. and also to act as an Advisory Body and to play helping role to member organisations.

The recent work that has been taken by this Women Cooperative Federation is to promote Women Cooperative Banks in each district and to give financial assistance to women members of societies and individuals. It is proposed to give linkage between women's bank and women multipurpose societies in the near future.

Lastly, the Women Cooperative Federation with the help of the other organisations like Women Development Corporation is organising Exhibition-cum-sale of products prepared by Women Cooperatives.

Participation of Women in Cooperatives in Karnataka

The status of women varies enormously from one part of the world to another. Nowhere do women enjoy equal status with man. They work longer hours and some times more harder than men, but their work is typically unpaid and undervalued.

The cooperative movement in Karnataka specially talking of women involvement, has had both success and failures. However, the validity of cooperatives for the poor to improve their economic status and working conditions in the self-employed and handicraft sector cannot be questioned. The cooperative is an important instrument through which the poor can get access to credit production inputs, Marketing facilities and the like cooperatives also provide a forum for the poor to get together and thereby acquire a better bargaining power.

Corresponding to the number of cooperatives, women participation in cooperatives has also been increasing due to the awareness and the cooperative education through the cooperative federation. The number of exclusive women cooperatives has also gone up. In Karnataka when the women education programme started in 1966, there were hardly 50 Women Societies and good working were only 20 in number. Now according to 1990-91 statistics, there are 565 Women Cooperative Societies exclusively run by women of various types. The traditional type of societies like condiments (pickles, pappad etc.) has changed now and today we find various types of women cooperatives dealing in Electronics, Export garments etc. However, a vast percentage of female

population who are in need of cooperative services are still remaining outside the fold of this movement due to various constraints and reasons like Government policy and the movement itself.

It is important to identify the reasons as to why women are not the force they are to be in the cooperative sector. Some of the reasons which first come to my mind are given below :

(1) The work turned out by women is not often properly recognised. Even when it is recognised, they are not properly paid for their work.

(2) Even where a women does have a independent wage, she does not necessarily have control over the use of that wage due to the fact that the present society is male dominated. Even though her income is supplemental to the family, there should be proper understanding in the family and also she must have certain freedom. Many of us know that whenever women earns her contribution to the family, is more because she does not have any other habit like man. For example going to a hotel, smoking cigarette, seeing a movie and attending clubs. Any active encouragement of women to become equal members of cooperatives must result in significant change in the statusquo at home, at work, in relationship and in control. The reasons presented so far probably explain why women have not been encouraged to participate in the cooperative movement.

However, now women have realised themselves and they have started organising themselves into some kind of cooperatives. Here the cooperative education plays an important role for the good working of the society. The members may be illiterate and may not be having any experience in cooperatives, to avail societies offered by Government etc. All these are to be tackled in the education programme. Now at present women are playing an important role in several income generating projects which are taken up by the District level Women Multipurpose Cooperative Societies like Handicrafts, Industrial, Readymade Garments, terracotta, pottery, condiments and consumer activity. The production of certain items like industrial components, assembling, bakery items like bread and bun, biscuits, woollen goods assumes great importance. The District level Multipurpose Cooperative Societies are even training women in such areas in coordination with the Women Development Corporation etc. including manufacturing of match boxes, agarbathies, candle, toys, blackboard, chalk and crayons.

Secondly we can train and assist the rural women through Women Societies in the field of kitchen garden, poultry forum bee keeping etc. which could enable them to utilise their spare time in a productive manner.

In Karnataka women are playing an important role in consumer activity. In general women members are included in the Purchasing Committee and they are sent to purchase items for the society. Whenever they feel that a particular item need not be purchased they will discuss with the management. They also help in arranging the products in an attractive manner. The women also have started organising Buying Clubs by purchasing the required items during the season and distributing among themselves, thus they not only save but also price and quality is maintained.

Small Savings : "Little drop of water makes a multi ocean". It is a fact that every women will attempt to save a little sum from what she gets for her house-hold management. It is also a known thing that whenever husband runs short of money he walks into the kitchen and search containers for some pocket money. The tiny saving of women collected can gradually grow to a big sum and that becomes a saving for her future. We are motivating women to form self-help groups among women members in Cooperatives. Recently a seminar was organised under the auspices of Karnataka State Women Cooperative Federation on this subject for the members of the District Women Multipurpose Cooperative Societies.

Apart from this women are also playing an important role through cooperatives in family planning, child welfare, nutritious food, kitchen garden, family budgeting and also awareness programme. If at all any economic programme is to be achieved, it is through cooperatives and of late women are taking lot of interest in the cooperative movement by their active participation in these activities.

Better Living Activities and Women's Participation in Agricultural Cooperatives in Japan

The Women Association of Agricultural Cooperatives (W.A.A.) in Asia at Tokyo, Japan has completed forty years of its working and it is contributing a great deal for balance development of agriculture and agricultural cooperatives and the welfare of farmers household members.

Compared to the members of farmers, the women membership is very small. The W.A.A.C. members contribute greatly to the total effort aimed at productivity increase and family welfare. They do not show any hard work. The President of T.A.C.S. in his 40th Women Congress speech has expressed that the W.A.A.C. members should actively involve in production than cultural and social activity, so that the production will be more and economic growth will improve.

The W.A.A.C. do their service to the best of their self satisfaction and they do not expect any regard or appreciation for their work from any body. They try to ascertain from the members through direct contract and hamlet level meetings are conducted.

The principles adopted by the W.A.A.C. show the interest they have taken in improving the facilities to the members and the production and good market for produced goods. They are :

1. Promotion of agricultural cooperative movement.
2. Members are to be women who are engaged in farming.
3. Autonomous management.
4. Solidarity.
5. Political nutrality.

The W.A.A.C. is promoting business relationship with J.A.C.S. (J.A.—ZENCHU) through their cordial relationship and their sincere service. Women members who are engaged in farming are made members of W.A.A.C. The W.A.A.C. have introduced credit, marketing, processing, mutural inurance, better living, book keeping, so that savings can be done on their household economy and on the basis of that credit can be taken to improve their farming system and increase production. The other credit facilities given to the farmer are short and middle term loans.

Marketing : Bulk marketing activity was introduced by WAAC. The goods were taken to morning and evening markets by W.A.A.C. to exhibit the goods so that the consumers will have first hand information and better exposure to the produced goods.

Purchasing : The W.A.A.C. members have introduced group purchasing or ham purchasing. The members are provided with goods of good quality, well packed, with proper weighment. All these aspects are looked after by M.P.C.S. The indent will be made by the Primary Societies and given to M.P.C.S. The M.P.C.S. sort out the indent according to itemwise made by the P.A.C.S. through proper checking by M.P.A.C.S. and supply to the members through P.A.C.S.

Processing : The W.A.A.C. has not done much progress as far as processing is concerned. They have a future plan of action to improve in this aspect.

Mutual Insurance : This is the best programme by WAAC by which a large extent of help is given to farmers. They intend to introduce National Pension Scheme also.

Better Living Activity : The WAAC have covered quite widely in motivating the farmers family as to what is better living. We do not find any difference between the rural and urban people in their living. The

introduction of book keeping, the way of dressing, the upkeeping of the house, use of utensils in kitchen, environment, civic sense, the behaviour of the members are all common. The WAAC has done a good job in this behalf. They also went further campaigning for buying cooperative brand commodities, health care activity and the consumer activity.

Role Played by Women Association of Agricultural Cooperatives (Japan)

We were asked to spend a day in Farmers' House to study and to know their living style, catering habits, cooking and uplifting of the house, modern kitchen, inter-action with member. I conclude by saying that the training programme was very useful. The Japanese A.C.. is flourishing because of their unity, hard work, one religion and one language. The following are my observations of the Women Cooperatives in Japan.

(1) Women members are not many in J.A.C.S. The same should be encouraged.

(2) More service for elderly people nursing.

(3) Hospital charges are more and that could be reduced.

(4) Preservation of Environment.

(5) Processing Unit.

(6) Effective role in consumer and producer relationship.

(7) Exchange of programme for WAAC members and the Young Married Ladies Group.

After my return from Japan training programme, I have taken up a taluk in Bangalore Rural District called Channapatna and a village in Channapatna. There is a Primary Women Cooperative Society there and with the assistance of that Society, I am motivating kitchen garden, health care, preservation of environment and family planning and family budgeting.

As an Indian participant in Rural Women Leaders Agricultural Training, I have gained so much of Japanese experience which I am trying to implement in Karnataka in my humble way.

The activities taken up by the Young Married Ladies Group includes motivating the younger generation to take up farming and keeping the culture and tradition, which is worth appreciating. These groups conduct music class, new type of cooking, kitchen garden, dressing, English learning etc.

Problems like falling down of the membership of women and not getting recognition etc. are still there. However, on the whole the work of W.A.A.C. is remarkable.

ENVIRONMENT AND COOPERATIVES

Introduction

In this beautiful world Nature has provided us everything in abundance like food, clothing, shelter etc. Most unfortunately, environment and ecological balance is disturbed to a large extent due to modern technological and personal needs. Environment is deteriorating to such an extent, that environment and ecology are engaging the attention of one and all.

The Pollution Factors

The factors that contribute to the pollution are so many. We contribute by filling rivers with polluted waters. In village and towns, piling up of garbage results in stink, filth and pollution. Excessive use of fertilisers

and chemicals also contribute towards pollution, resulting in serious ailments like cancer, skin diseases etc. Food, fruits, flowers etc. are contaminated due to pesticides and insecticides. We are not making efforts to protect our forests. Instead we are cutting trees indiscriminately destroying thick forests. No importance is given for planting trees. Industrial waste, release of industrial gases and waters, stink from the garbage and sewage, radiation from nuclear plants are also contributing to pollution at the cost of human life.

Action initiated to Protect Environment

Government and other agencies are concentrating on preservation of environment and ecological balance. From the cooperative sector, it is heartening to note that International Cooperative Alliance (ICA) at its Central Committee Meeting in Madrid adopted a resolution expressing their concern about the critical state of the environment and stressing the need for appropriate measures.

Basic Role that Could be Played by Cooperatives in the Context of India

India is the seventh largest country in the world. The climate of India is tropical monsoon type with four seasons viz., winter, hot weather summer, rainy south-western monsoon period and post monsoon period. The present population is 845 million with two-third of the populatin living in rural areas. The large population has resulted in large-scale unemployment and environment problems. Increase of use of energy, fertiliser, pesticides etc. in agriculture and the destruction of forests are contributing to the problems of environment. As a result of industrialisation river pollution, etc., assuming alarming proportions. Migration of people from villages to cities in large numbers, increasing of slums in cities, vehicular emission, lack of sanitation, water supply etc., are also contributing to the problem of environment.

The problems of environment management were given a serious thought in India right from 1972. Government has taken up steps to provide legal base by enacting Acts in this behalf to avoid noise pollution, water pollution etc.

There are now more than 3,50,000 cooperative societies in India with a membership of more than 150 million and working capital of 621.440 million. Agricultural, Consumer, Dairy, Fisheries Cooperatives have a particular role in preserving environment and avoiding pollution. Correct use of pesticides should be ensured and also mise use of fertilisers by illiterate members of Cooperatives should be avoided, in Agricultural Cooperatives. The Fertiliser Cooperatives with their Units contributing to environment pollution through liquid effluent and gaseous emissions. Sugar Factories and distilleries and paper mills let out effluent which are pollutant. In Oil Mills environmental problems are created from the gaseous emissions coming out of boilers. However, preventive measures have been taken by all these Cooperatives.

Task for Cooperatives and Their Role in Protection of Environment

Being people's organisation cooperatives can play an important and significant role in creating awareness among the people in preserving environment. The following activities could be taken up by cooperatives.

- Creating awareness among the people about environmental protection.
- Cooperatives to integrate environmental protection in their buiness plans.
- Incluion of topic on environment in the syllabus of Cooperative Training Centres/ICM & Member Education Classes.
- Advising safety measures to cooperatives engaged in production and distribution to ensure safety and quality goods handled by them.
- Providing momentum to energy conservation and waste resource recyling.

- Cooperatives to collaborate with Government on the issue of environment preservation.
- Developing a clear strategy to control population and pollution.
- Organisation of Conferences/Seminars/Workshop on the subject of Environment preservation at various levels by the Cooperative Unions/Federation.
- Publicity to the burning issue of Environment preservation through posters, books and booklets etc.

Conclusion

Women can play an important role in preserving environment and awakening the rural women folk in particular in this behalf. Clean drinking water, fresh air, etc. will bring pleasure to one and all, resulting in good health. Social conditions could well be improved among rural men and women by creating awareness among them. The Women Cooperative Societies should take oath that each member should be followed up by the Societies.

Source : Environment and Cooperatives by Mr. Daman Prakash.

ANNEXURE

IMPORTANT POINTS FOR EDUCATION INSTRUCTORS

(1) Your communication should be to explain/inform/persuade/convince.

(2) Arrive at the venue of your class well in advance to enable you to check your class room arrangements, reference material, teaching aids, chalk, board, charts, drinking water facilities and seating arrangements etc.

(3) while talking to the participants of your class, you must be properly seen and clearly heard.

(4) While using chalk board :

(a) Keep it to your left;

(b) when writing do not talk;

(c) Write neatly, briefly and clearly;

(d) give the audience time to read and understand;

(e) Then carry on talking, explaining;

(f) While leaving the calss room clean the chalk board.

(5) Effective communication means

(a) Understanding;

(b) Agreement;

(c) Action;

Any real agreement and true understanding must be expressed in appropriate action.

(6) If the audience coming together for the first time, it is advisable to have informal introductory session. This is called warming up. Start by introducing yourself, feel ease. Try to be informal. Smile occassionaly let each member of your group introduce herself/himself. Make yourself as relaxed and as friendly as possible. Don't be too serious, never feel or act as if you are superior to the audience. They must be given an opportunity to act. They must have continuous sense for learning. Make them interested.

(7) Your first inpression on your participant is very essential communication of your message.

(8) Introduce your subject and briefly tell them the points intend to cover, then start interestingly. Give some good example to support your point. Some of your talk may contain emphasis on important points and summarising the contents.

(9) **Spoken Communication Means**

(a) **Maintain contact;**

(b) **Involve your audience;**

(c) **Change the tempo of your delivery of talk;**

(d) Speak with only brief note;

(e) Stand in a relax fashion.

When you finish your lecture, you can sit down. While delivering lecture you should address the audience.

(11) (a) Be friendly;

(b) Be patient and tolerant;

(c) Be courteous;

(d) Be sympathetic, helpful, tactful;

(e) Be imaginative, creative and resourceful;

(f) Be inform but without being authoritative;

(g) Cultivate a positive and encouraging attitude;

(h) Practice democratic leadership;

(i) You should be well read and inform;

(j) Try to control your emotions and don't loose your temper;

(k) Try to cultivate the dynamic personality and self-confidence.

(l) Remember to be honest in your work.

(12) Special Points Noted to be in the Speech

(a) Speak slowly and allow each word and sentence to be heard. (If you do not speak slowly and clearly you will not be able to educate).

(b) Avoid difficult words and use simple words. YOu are talking to express but not to impress.

(c) Avoid monotony.

(d) Be enthusiastic.

(13) (a) An Instructor should not regard herself complete and competant.

(b) An Instructor should change according to the circumstances.

(c) Satisfaction of Instructor is enlightenment and motivation of the members.

BETTER LIVING THROUGH CO-OPERATIVES

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Better Living is a relative term which may be interpreted in various ways depending on the socio-cultural background, economic situation and levels of awareness. However, in the context of rural areas, this means to improve upon the benefits of village living by removing its short comings. This calls for multifarious activities to be planned, managed and monitored by the people themselves. Co-operatives being organisations of the people, for the people and by the people are most appropriate forums for initiating better living activities. Better living activities, for improving the quality of life of its broad-based membership, are in consonance to the goal of the co-operatives.

Better Living in Japan

Better farming, better business and better living are the basic norms on which village co-operative function. The efforts of Japanese Agricultural Co-operative movement exemplify the truth of the norms. The agricultural co-operatives of Japan have solidified the village population - men, women and youth- through Han (group) system with the active involvement in co-operative activities and decision-making. To these co-operatives, better living activities are as important as farm management and

technological innovations. Since the member is the focal point in the co-operatives, all these activities are for his/her upliftment and are complimentary to each other.

The wide range of better living activities in Japan are related to:

- household planning and budgeting for daily living,
- stabilization of agricultural income,
- support to household income with self-employment opportunities and small savings,
- protect and improve health,
- caring the elderly people and children,
- intensification of spiritual, cultural and sports activities,
- generation of environment consciousness and use of environment-friendly products.

Majority of these activities are managed by women in the villages through their horizontal and vertical network of 'Agricultural Women's Associations'. These associations collaborate with agricultural co-operatives and get necessary financial as well as infrastructural support from the co-operatives in undertaking the activities. The associations are independent and autonomous and their functions compliment and supplement the activities of the co-operatives.

Better Living in India

Women in Indian villages actively participate in most of the village based activities. They are active in farm operations on paid or unpaid basis; look after their households - cooking, cleaning, washing, carrying food to farm, caring the old, the sick and the children, animal husbandry, growing vegetables, etc. They also make efforts in stabilizing household income either by working in household business as unpaid workers or in other's business as paid workers. Unconsciously, these women are engaged in better living activities.

Future Prospects

In order to make these women conscious and utilize their potential to the maximum extent, it will be necessary to organize them into groups, preferably on hamlet basis, provide them functional education and training and bring them in the purview of village co-operatives. The enlightened and conscious hamlet groups of women through its horizontal and vertical group networking will surely be an asset not only to the village co-operatives but to the agricultural co-operative movement of the country. These groups will be helpful in:

- farming operations and diversification of activities,
- proper utilization of loan and its recovery,
- utilization of consumer services,

- improving the standard of living of members,
- eradication of rural poverty and illiteracy,
- promotion of literacy, childcare and health activities,
- making best use of on-going government/co-operative programmes,
- environment protection and waste land development,
- elimination of socio-cultural taboos and popularizing family planning norms.

In the present situation it may not be difficult for village co-operatives to promote hamlet-based self-help groups as government has already adopted a new approach and accepted self help groups as a sub-system of of agricultural credit co-operatives. The basic need is to educate the members of village co-operatives as well as those of linked co-operatives and help them in changing their stereo-typed ideas/attitudes and the way of functioning.

Role of Village Co-operatives

- Make the members conscious of environment protection and better living activities,
- Promote hamlet-based women specific or men and women joint groups and networking of the groups horizontally and vertically,

- Coordinate with co-operative education/training organizations, development departments/agencies and NGOs for conducting awareness generation and skill/technological upgradation programmes,
- Provide infrastructural facilities,
- Coordinate with financial institutions for supporting better living activities,
- Constitute a committee at society level with membership of group representatives for planning, implementation and monitoring,
- Advocate the activities at higher tiers through existing network,
- Provide consultancy and guidance.

Role of Higher Tier Co-operatives

- Giving due recognition to environment and better living activities,
- Ensuring need based functional education and training to the members of village co-operatives as well as group members,
- Establishing better living model projects in selected areas as a source of motivation to others,
- Giving incentives to the best working village co-operative in the area of better living. It may be in the form of an award/study visit to another country.

Role of Extension Officers

- Provide education and training facilities to the members of village co-operatives,
- Coordinate with concerned government departments and co-operative/financial institutions.
- Facilitate village co-operatives in group promotion networking, constitution of committee, etc.

Subject IV Water Resources and Environment

Water Resources and Environment

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1.0 Introduction

1.1 Environment, in its broadest sense, may be defined as the sum total of conditions surrounding an organism or group of organisms for affecting the survival, growth or well being of the organism at a given point in space and time. This definition covers all the people, animals, plants, all of the earth's resources, etc. Ecology is the study of the relationship between organisms and their environments including other organisms.

1.2 Water in Environment

Water is a major component of that environment in which man occupies the centre-state. "Water is life", not only per se. Apart from the need for drinking, water is needed for producing food and fibre; water is needed in process industries and in manufacturing; water is needed to produce energy-hydro, thermal and nuclear. This great need for water has brought into focus the fragility of environment and the need to guard it. All great civilizations had grown around 'Water' and many had perished with water, perhaps not having realised the importance in its sustainable development.

The status of water in environment is unique. Ever since the birth of earth, from day one, the need for water is always on the increase, not just because of increase in human population but because all living beings are multiplying at a fast rate. The increase in demand has brought tremendous pressure on resource development. The development, in turn, has tended to disturb the status of water in the overall environment. The disturbance, if not contained, may seriously impair the capacity of the resource to meet the demands of future generations and the present civilisation could as well go the same way as its predecessors.

2.0 Population Growth and Pressure on Environment

2.1 Obviously, if environment should not be affected, human population should remain static and in fact, all life too. Equally, obviously, that is not possible. The following statement shows how the population has increased during the decade 1981-91 by 161 million, which is equal to the population added during the three decades 1931-61.

Year	Total population (millions)	% Rural population	% Average annual exponential growth rate	No. of persons per sq. km.
1901	238	89	-	77
1911	252	90	0.56	82
1921	251	89	—0.03	81
1931	279	88	1.04	90
1941	319	86	1.33	103
1951	361	83	1.25	117
1961	439	82	1.96	142
1971	548	80	2.20	177
1981	683	77	2.22	216
1991	844	74	2.11	267

The density population has increased from 77 persons in 1901 to 267 persons per sq. km. in 1991. There is thus a continuous decrease in availability of natural resources including land and water. Under these circumstances, environment cannot remain pristine. Change is inevitable. Water is not an exception.

3.0 Water Resources Development (WRD) and Environment

Drinking, producing energy, running the industry, irrigation, all these are the needs of man to preserve, himself in the very environment of which he is the centre piece and they can be met only, if water can be conserved. Conservation through storage has become essential because of the capricious nature of rainfall, 70-90% of which occurs in about four months of the monsoon period with very uneven spatial and temporal distribution. Water resources development coupled with judicious water management for meeting the demand of the mankind, now and in future is very important. Let us have a look at the water resources of India and the present day scenario of water use.

4.0 India's Water Resources and Present Scenario of Water Use

4.1 India with a geographical area of nearly 3.29 million square kilometers experiences extremes of climate. Normal annual rainfall varies from 100 mm in Western Rajasthan to over 11000 mm at in Meghalaya. Variability of rainfall from season to season is also very high. The annual average rainfall over the country is of the order of 1170 mm depth which is nearly 4000 km^3. Of the total precipitation, a part goes towards increasing ground water storage, a part is lost as evapotranspiration and the remaining appears as surface water.

The average flow in the river systems of the country has been estimated to be 1880 km^3. But over 90% of the annual runoff in peninsular rivers and over 80% of the annual runoff in Himalayan rivers occurs during the four monsoon months of June to September. Also, the amount of water that can be actually put to beneficial use is much less. The major constraint in exploiting the available water resources is the fact that major part of the river flows occur as flood flows during three or four months and necessitating storing the flood flows in reservoirs for their utilisation. There are also constraints to technology and interstate issues. The recent estimates made by the Central Water Commission indicate that the water resources utilisable through surface structures is about 690 km^3 only (about 36% of the total).

4.2 India has a long and illustrious history in dam building, having more than 3600 large dams (more than 15 M height) in the country besides tens of thousands of medium flow of the rivers for use during the rest of the year. Total live storage capacity of reservoirs completed upto 1989 is about 166 km^3. Besides this, dams under construction will add another 77 km^3 and those under formulation are expected to add another 130 km^3.

4.3 Ground water is another important phase of water. Quantum of water which can be extracted economically from the ground water aquifers every year is generally reckoned as ground water potential. The Central Ground Water Board has undertaken scientific assessment of the quantum of replenishable ground water in the country. The preliminary estimates made by the Board indicate that the utilisable ground water is about 420 km^3.

4.4 India has been predominantly an agriculture based economy in the past, and will remain so at least for the near future. Even today, about 65% of the population is dependent on agriculture. Water resources projects have played a dominant role in the past in the development of agriculture and in making India self-reliant in food grain production. This facilitated the diversion of precious foreign exchange reserves to pay for the import of other essential commodities required for national growth. The National Commission of Agriculture (Ministry of Agriculture and Irrigation, 1976) has projected that the country's population is likely to increase to about 1000 millions by 2000 AD from the present level of 850 millions and accordingly the demand for food grains is likely to increase to about 240 million tonnes from the present level of 175 million tonnes. Such a large increase in demand can only be met if the tempo of agricultural production is stepped up. Further, when such a large population is depending upon agriculture, it is utmost necessary that this agricultural work force is provided year round employment in their fields. This can be made possible only by providing assured water supply for 2 to 3 crops in a year instead of a single crop during the rainy season.

Being faced with a rainfall season of unreliable nature, agriculture in India is heavily dependent on irrigation. The principal consumptive use of water is in irrigation. The net sown area in the country increased

from about 110 M. ha. in the year 1950-51 to about 140 m. ha. in 1970-71 and remained more or less constant thereafter. It is in this context that intensive land use will have to be practised for stepping up the food grain production. Agricultural statistics for different states show that the yield from irrigated areas is much higher than that from the un-irrigated areas. The irrigated area in the country was only about 21 M. ha. in 1950-51. As compared to this potential that has been created upto 1991-92 is about 85 M. ha. against an ultimate potential of 113 M. ha. the actual area irrigated is about 78 M. ha.

4.5 Water for Drinking

Drinking water is the most vital of all water demands and rightly given the highest priority in the National Water Policy.

The estimated water requirement for domestic use and for livestock is 25 billion cubic metres (BCM) at present whereas it is forecast to reach 40 BCM by 2025. This requirement is not high in terms of total water resources of India, but localised demands of urban centres and drought prone areas create supply problems. During the prolonged drought of 1984-87, the available meagre reservoir supplies were denied to other users and reserved to provide domestic water to population and cattle.

The drinking requirements of Delhi were being met form Yamuna till 1950s. At present, the demand for extra water is met from storages in Bhakra and Ramganga. Future requirements, 2001 onward, can be met, only by proposed storages at Tehri, Kishau and Renuka dams.

The municipal and industrial water needs of Bombay city are being met from dams at Bhatsa, Vaitarna, etc.

Large rural population residing in the Nalgonda District (A.P.) are reported to have been affected by fluoresces, caused due to excess floured content prevalent in the ground water. The people are agitating for supply of canal water from Nagarjunasagar for drinking to alleviate their health problems.

The future sources of water supply to urban and rural areas will similarly depend on surface storages.

4.6 Water for Industries

The industries needing huge quantities of water are mining, basic metal industry (steel and non-ferrous metals), chemical, fertilisers, petro-chemicals, paper, textiles, cement, etc. Water demands of industry are not estimated precisely. Rough estimates indicate, that the industrial water use in 1989-90, might be 14 BCM, and the forecast for 2050 is 120 BCM.

Thermal power plants need water for cooling, ash disposal, etc. The consumptive use is estimated, as 0.01 cumec per 5.75 Mega Watt (mW) of installed capacity.

Tenughat Dam has been constructed, to meet the demands of Bokaro Steel Plant and Yeluru Reservoir to meet the needs of Vishakapatnam Steel Plant. Bhilai draws its requirements from Mahanadi Reservoir.

4.7 Hydro-Power

The installed capacity of hydro-power in India has gone up from pre-plan generation of 560 mW to 17,650 mW today-30 fold increase. It is difficult to imagine the power situation in the absence of Bhakra, Koyna, Sharawati, Hirakud projects etc. As per the long term National Power Plan formulated by Central Electricity Authority, country's total installed capacity needs to be raised to about 174,600 mW by 2000 AD. It means, an additional growth over 10% every year during the entire period would be necessary. The National Plan envisaged a mixture of hydro, thermal and nuclear projects in the ratio of 34%, 60% and 6% respectively. Considering that hydro-power is best suited for peaking purposes, it has been found that additional capacity requirement during 8th and 9th Five Year Plans can be reduced by 11.69% by increasing hydro-power share to about 43.5%. According to recent estimates, the hydro-power potential is placed at about 600 million units of firm annual energy and 94,044 mW of firm power at 60% load factor, but of which only 13% has been exploited so far. With the completion of ongoing and sanctioned schemes, the potential exploited would be about 20%.

4.8 Flood Protection

Occurrence of flood is a natural phenomenon and man has had to live with it since very beginning. It is well recognised that floods will continue to occur as it is dependent on a combination of natural phenomenon and human interference. The problem of flood is accenturated by encroachments into flood plains which is a direct consequence of pressure on land due to population growth. About 40 million hectares (M. ha.) has been assessed as flood prone. Of this, about 32 M. ha. has been estimated to be protectable. Upto the end of VII Plan (March, 1990), an area of about 13.8 M. ha. has been afforded reasonable protection through structural means. The various steps towards flood management include structural works such as storage reservoirs, embankments and non-structural works such as flood plain zoning, flood forecasting, flood warning, etc. Reservoirs have played an important role in the managing of floods. Storage dams like Bhakra, Hirakud, Ukai and DVC complex and embankments as in Assam, Andhra Pradesh, West Bengal and Bihar have provided and will continue to provide immeasurable flood control benefits. Some of the worst floods in Mahanadi, like in 1982 and 1985, have gone almost unnoticed because of their absorption by Hirakud Dam. The rivers like Damodar and Kosi, known as 'rivers of sorrow' of Bengal and Bihar respectively, have been tamed by the construction of various water resources development structures. The construction of Ukai dam on river Tapi in Gujarat in the year 1972 has proved to be a boon to the people of Surat city. They have now totally forgotten that the river Tapi used to flood their city every year in the past.

4.9 Other Environmental Benefits

Water resources projects create water bodies which modify microclimate both in upstream and downstream. A large area of the country has arid of semi-arid climate which can be moderated by water reservoirs. Large tracts of desert in Rajasthan have been transformed into a green landscape due to irrigation projects.

Water Resources Development (WRD) projects have proved to be source for increased fish production. Ukai project is a good example amongst many where the increment in fish production has been two fold in two years.

The reservoirs have been centres of recreation from time immemorial. Krishnarajasagar (Karnataka), Matatila (Uttar Pradesh) and Jayakawadi project (Maharashtra) are examples where they have become tourist attractions on account of beautiful gardens and ponds developed downstream of the reservoirs.

5.0 Environmental Adverse Impacts and Alleviation Measures

Like all development activities, WRD, while giving planned benefits, leads to a variety of environmental impacts which might be adverse.

5.1 A Classification of Adverse Impacts

A. *Physical*

(i) Population displacement;

(ii) Diversion of land;

(iii) Waterlogging and salinisation;

(iv) Reservoir induced seismicity;

(v) Historical Monuments;

(vi) Reservoir sedimentation;

(vii) Erosion and morphological changes downstream of a dam;

(viii) Thermal stratification;

(ix) Damage to landscape;

(x) Impediments to fish migration and downstream aquatic life.

B. *Biological*

(i) Submergence of forest;

(ii) Disturbance to flora and fauna;

(iii) Water related diseases;

(iv) Eutrophication.

C. *Chemical*

(i) Deterioration in river water quality;

(ii) Ground water pollution.

6.0 Displaced People

WRD has come to be construed as synonymous with construction of dams. Dams have become synonymous with submergence and displacement of people. Rehabilitation and resettlement of displaced people is the major problem facing WRD projects.

In a study conducted by the World Bank on 11 irrigation projects between 1978 and 1988 impacts as under were reported.

Land submerged	143,000 ha.
Displaced families	75,000

The study also indicated that about 6 families are displaced per 100 families provided with irrigation. In a study conducted by Central Water Commission on 54 projects, the impacts were :

Total area	1,326,000 ha.
Total forest area submerged	217,000 ha.
Total population affected	1,440,000

The above figures reflect the environmental problems faced by WRD projects. All the affected people are to be adequately compensated so that the projects become socially acceptable.

6.1 Any policy of resettlement and rehabilitation (R & R) must attempt to recreate for displaced persons a situation allowing them to improve or atleast to restore the standard of living they had prior to displacement. Possibly a good R & R Policy should attempt bringing the displaced persons to the mainstream of developed sections of the country's population. R & R must be treated as a whole community approach to take care of the needs of all. Commissioner for Scheduled Castes and Scheduled Tribes and Non-Governmental organisations had jointly prepared in 1989 a draft National Policy on Development and Resettlement. At the level of individual States, Maharashtra, Madhya Pradesh, Karnataka etc. have passed legislations and in some other States, peace-meal measures towards R & R have been adopted but found not effective. They lack adequate policy guidelines and legal frame work. Implementation also suffer due to administrative apparatus and lack of funding.

National Water Board has constituted a sub-committee to evolve a national policy on R & R.

7.0 Waterlogging and Salinisation

Waterlogging is an outcome of deficiencies in infrastructure planning and indiscipline in water management. Creation of structures such as canals and roads without proper cross drainage provisions disrupt natural land drainage leading to congestion of natural run-off. This is in the form of temporary surface ponding. Indiscipline in application of water to farms raises ground water-table affecting the root zone, reducing crop yields due to poor root aeration and in extreme situations salinisation of soils.

7.1 The National Commission on Agriculture (1976) estimated that the total area subject to waterlogging in India is 6 M. ha. out of which 3 M. ha. is on irrigated lands but only part of this is induced by irrigation. Latest estimates show that this could amount to about 3% of the irrigated command. In most irrigation commands, overwatering leading to localized waterlogging is common in the head-reaches of command areas.

7.2 Prevention is better than cure. Preventive measures include, apart from the more expensive installation of drainage system, a properly designed and constructed conveyance system and conjunctive use of surface and ground water. For the sustanability of surface water irrigated agriculture, improved water management practices are urgently needed. Head-reach users have to be disciplined strictly to avoid over-watering, the root cause of waterlogging. Maintenance of water courses needs attention in this regard. In some areas, with particularly poor natural drainage, major drainage works with large investments may also be necessary.

7.3 Strict discipline in following the standard practices of water utilization namely WARABANDI and by adopting modern techniques such as drip irrigation and sprinkler irrigation measures, even though costly at the time of introducing these methods, would go a long way in arresting or atleast minimising waterlogging problems considerably.

8.0 Historical Monuments

There is sometimes likelihood that invaluable historical monuments may either be submerged or affected by the construction of storage reservoirs. Due to the construction of Nagarjunasagar dam on the river Krishna in Andhra Pradesh, valuable historical monuments were to come under submergence. These were excavated well before impoundment and shifted to a museum on the top of a nearby hill coming within the reservoir. Similarly, Dargah at Galikot which would have come under submergence of Kadana Reservoir on the river Mahi in Gujarat, was protected, from submergence by constructing a ring bund. Srisailam and Narayanpur reservoirs are other examples, where historical monuments have been rehabilitated successfully.

8.1 By proper planning, at the initial stages of a project, sites of archacological and historical importance can be protected.

9.0 Deforestation

In 1947, it had been estimated that about 75 M. ha. of land was under forest cover. There is a constant encroachment on the forest area. Good forest as it exists now, is reported to be 40 M. ha. and is being diverted at an average rate of about 1.5 M. ha. per year. However, the forest submerged due to water resources projects is not significant. Going by data on 54 projects, total forest land diverted on account of dams is about 0.5 M. ha. only.

9.1 Forest diverted due to submergence or irrigation infrastructure is being made up through compensatory afforestation on revenue lands and on degraded forest lands. Further, wastelands are increasingly being utilised for afforestation purposes. The plantation along the periphery of reservoirs and along the canal banks add to the vegetative cover.

10.0 Health Problems

Water related diseases, such as Malaria, Typhoid, Diarrhea and Filariasis can be spread through unsanitary water or by presence of stagnant or slow moving water. In India, only about three or four foci of schistosomiasis snails have been observed. The disease appears to be localized and not spreading. This special behaviour is being monitored by the Indian Institute of Communicable Diseases. Data on other diseases is inconclusive though knowledge of vector life cycles indicates that risks are present.

10.1 Surveys in selected irrigated commands also reveal that there is a general decline in incidence of diseases in these areas. Firstly, the very availability of water had led to improvement in level of sanitation. Secondly, the improved economic status has made people health conscious and capable to avail of requisite health care. Vectorial risks can be substantially reduced by removing sources of stagnant or slow moving water, and by ensuring continued maintenance of drains and canals and efficient water management.

11.0 Watershed Development

The basic principle in watershed development is to retain the precipitation within the watershed, reduce top soil loss and minimise run-off. This can be achieved through gully plugging, check dams along the natural water courses, contour bundling, contour ditches, percolation tanks, etc., depending upon the terrain. These measures, in addition to making surface water available for some period, also help in re-charging the aquifers for using ground water later on. A further benefit is soil conservation, which helps in increasing land productivity and incidentally, in reducing silt flow from such lands into streams and rivers and finally into reservoirs or seas.

11.1 Through an integrated planning approach and modern technology, bio-mass (fodder and fuel) production can be increased to meet the demands of the people and the cattle. This will prevent people from felling trees towards their fuel requirements and not to take cattle on to erosion prone areas for grazing, thereby protecting the environment.

11.2 National Water Policy recognizes development considering watershed as a unit, instead of any administrative boundary. A micro-watershed of about 5,000 hectares may comprise not more than one or two villages only and the local people can be involved in the development effectively, so that, they can be made aware of the necessity of protecting the environment for their own good.

11.3 Watershed development in Ralegaon Shindi (Maharashtra), Panipanchayat in Purandhar Taluka (Maharashtra), soil conversation in Adgaon (Maharashtra), water harvesting in Randhar (Uttar Pradesh), afforestation by Vanrai (Pune), integrated watershed development in Sukhomajri (Haryana), are all experiments by Non-Governmental Organisations (NGOS) which have proved a resounding success. Their replicability on a national scale calls for a suitable but unobtrusive mechanism which will motivate and mobilise NGOS as effective instruments for implementation of the concept of micro-watershed development. The development of micro-watersheds would help in preventing migration of rural people to urban areas in search of employment and in preserving environment. But for such efforts to succeed a dedicated cadre and network of voluntary agencies has to be built up.

12.0 Water Quality

12.1 *Pollution From Waste Water*

A significant part of untreated waste waters generated in the urban centers, advertently or inadvertently are disposed off into the surface water bodies, namely, reservoirs, lakes and revers. The pollutants also reach groundwater. Example of such pollution are :

Hot water discharges from Thermal Power Plants into Rihand Reservoir.

- Industrial effluents discharged into some of the Damodar Valley Corporation Reservoirs, as illustrated by difficulties to use the reservoir water at Maithon when levels go down during non-monsoon period.

- Domestic effluents from the house boats let into Dal lake in Jammu & Kashmir.

- Polluted groundwater in Hyderabad in the industrial area of Bolaram.

12.2 *Recycling of Waste Water*

It has been estimated, that only 30 per cent of domestic water supply is consumed and the remaining 70% is discharged as waste water. In the case of industries the return water is about 80 per cent. Waste water from any source need not be considered as water wasted. Waste water can be looked upon as a source of additional water for its reuse for various beneficial purposes for which water quality does not have to be brought to a high level of purity.

The waste water from the toilets and wash basins can be discharged into the sewer. Waste water from bath room, kitchen etc. can be subjected to minimal treatment for making it fit for flushing toilets and watering lawns. By this approach, the waste water effluent can be minimised, thereby conserving water and improving the environment.

Treated waste water can gainfully be used for irrigation. In fact, the nutrients present in treated waste water are an advantage for agricultural production.

Industrial processed water can be recycled for cooling purposes, since cooling can tolerate low quality water. In Bombay, 5 tall buildings utilise the treated sewage recycled water for air-conditioning. ISRO satellite centre, Bangalore, M/s. Bajaj Auto Ltd., Aurangabad etc. are utilising their treated waste water for horticulture, gardening and other uses. About 45 industries around Bombay, have adopted reuse of their processed water in some form or another.

The reuse of processed water reduces demand on fresh water. Consequently, industries should be able to lower production costs and simultaneously improve the quality of water in downstream reaches.

12.3 Water Quality Monitoring

Riverine systems play an important role in transport of waste water, whether domestic or industrial. The rivers receive effluents both from point sources like drains, municipal sewers or industries and from non-point sources like surface and sub-surface runoff from agricultural fields. The pollution problem is increasing by leaps and bounds with the effluents being discharged directly into the streams, rivers and underground, without any treatment. It is necessary to monitor the quality of water, before any suitable measure for controlling or abatement of pollution is contemplated.

Central Water Commission, initiated monitoring of quality of surface water in 1960. Central and State Ground Water Boards, are monitoring quality of ground water. Central Pollution Board and State Pollution Boards, also are monitoring water quality. This is a gigantic job considering the number of streams and rivers and the area of the country.

13.0 Ground Water

Ground water is normally free from physical impurities. It is also expected to be free from biological impurities. The problem is one of dissolved chemical impurities. Apart from industrial waste water, chemicals in fertilisers and pesticides used in agriculture may also find their way into ground water. Though, no definite indicators are available as to the extent of such pollution and its effects, urgent studies are required in this regard especially in view of the expanding role of these chemicals in irrigated agriculture.

13.1 A Hydrographic network of 13,000 stations monitors the levels and the quality of ground water in the country. A national status report on water quality was brought out in the year 1979 by Central Ground Water Board. In the hydrologic map of India, revised in 1989, the ground water parameters have been indicated. The state-wise maps were prepared for the ground water quality in the year 1987. These do not account for pollutant sources and extent of degradation.

14.0 Education and Research

The intellectual roots environmental protection are as old as the Vedic period. Stockholm Conference, 1972, calls for environmental education as one of the most critical elements of an all out attack on the world's environmental crisis. Such education is supposed to be based on the principles outlined in the UN's declarations on the international economic order which take into account, the satisfaction of needs and wants of every citizen of the earth and of harmony between humanity and environment.

14.1 Solutions to all environmental problems are not readily available. Research and development programmes are needed, in order to, reduce pollution of water bodies. Scientific and technical personnel should be encouraged to undertake specific research projects for seeking solutions to problems in various sectors of environment. There is a need to upgrade the technology so that water consumption is reduced without affecting productivity. This will also lead to reduction in waste water quantity to be treated and the pollutants entering the water bodies. Environmental education and research play a major role in changing perceptions and will lead towards evaluation of changing values in the scientific, technological and ecological links among all the organisms. They will promote environmental understanding and awareness of environmental rights, at all levels of society. They will help, to develop comprehensive social and economic objectives, to ensure the success of environmental programmes.

15.0 Conclusions

Water has a unique status in our environment. Water is needed to meet many demands to sustain the very environment of which it is a major component. Development of water, as a resource, has thus become not only essential but unavoidable, if the demands of the growing population are to be met in terms of drinking water, fibre, food, energy etc. However, if we want future generations also to enjoy the same benefits unimpaired, impact of such development on environment cannot be ignored.

Water Resources Development and protecting water related environment are thus two sides of the same coin. Overlooking either is not in the interest of society they are intended to serve.

Environmental issues are dynamic and so is environmental management. Environmentally sustainable development is possible. That should be and is our goal.

Subject V Natural Resources and Environment—Management of Land

Natural Resources and Environment—Management of Land

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India is the second most popular and the seventh largest country in the world. The geographical area of the country is 328.73 million hectares out of which about 45% is under cultivation. Presently about 140 million hectares are net sown, while 176 million hectares are gross sown and about 24 million hectares remain fallow. Due to the rapid growth of population, the land use pattern in India had significantly changed over the period 1960-61 to 1984-85 (Table 1). The area under culturable wasteland, fallow, barren land, permanent pasture and grazing land, and land under miscellaneous trees have registered significant decline because these lands have increasingly been brought under cultivation. The decline in pasture and grazing land is bound to have adverse effect on ecology.

TABLE 1

Landuse Pattern in India

Sl. No.	Land Utilisation Class	Area in million hectares 1960-61	1984-85	% change 1960-61 to 1984-85
1.	Culturable wasteland	19.21	15.74	-18.1
2.	Fallows other than current fallows	11.18	9.55	-12.4
3.	Barren Land	35.91	20.07	-44.1
4.	Non-agriculture Non-forest	14.84	20.41	37.5
5.	Permanent pasture & grazing Land	13.97	11.93	-14.1
6.	Miscellaneous tree	4.46	3.39	-24.0
7.	Total cropped area	152.77	175.96	15.2
8.	Net sown area	133.20	140.07	5.3
9.	Cropping intensity (%)	114.70	125.60	10.9
10.	Current fallows	11.64	15.36	31.9
11.	Net irrigated	24.66	41.78	69.4
12.	Gross irrigated	27.98	54.06	93.2
13.	Irrigation intensity (%)	113.50	129.40	15.9
14.	Forest	54.05	67.16	24.2
15.	Reporting Area	298.46	304.32	2

Extent of Problem Areas

Though efforts for the use of fallow lands have continued year after year yet the degradation of land continues to grow. Almost 50% of the land area is chronically sick. It consists of area subject to water and wind erosion (144.43 million hectares), area degraded through special problems like waterlogging, alkalinity, ravines and gullies, areas subject to shifting cultivation riverine lands and torrents (29.22 million hectares). The available data indicate that the picture has not changed substantially over time except that the waterlogged area, area having alkali soils and area under shifting cultivation have recorded substantial increase (Table 2).

Table 2

Extent of problem areas in India

(In million hectares)

S. No.	Particulars	1976-77 (updated 1980-81	1981-82 (updted 1984-85	% Change
1.	Geographical area total	329	329	-
2.	Area subject to water and wind question	150.00	144.45	-4
3.	Area degraded through special problems			
	3.1 Waterlogged area	6.00	8.53	+42
	3.2 Alkali soils	2.50	3.58	+43
	3.3 Saline soils including constal saline and sandy areas	5.50	5.50	-
	3.4 Revines and gullies	3.97	3.97	-
	3.5 Area subject to shifting cultivation	4.36	4.91	+13
	3.6 Riverine and torrents	2.73	2.73	-
	Total special problem area	25.06	29.22	+17
4.	Total problem area (2+3)	175.06	173.65	—1

The country has given due priority for the conservation of soil in order to make agriculture sustainable so that future generations do not suffer due to the present over exploitation of land resources.

Land for the humanity or for country is a limited resource. Increasing population will put tremendous pressure on this source. In India per capita availability of land will come down to 0.15 hectares by 2000 AD in comparison to 0.20 hectares in 1981. The country will need an additional area of 58 million hectares, for crop production (8 million hectares), fuel and timber wood (40 million hectares) and fodder production (10 million hectares) by 2000 AD.

Forests

Though the forest area is claimed to be 66.86 million hectares (21.9%), National Remote Sensing Agency's photo imagine shows that only 13.5 per cent area is actually under forest cover. The forest cover is much less than one third area visualized in the National Forest Policy, 1988. During the past independence period, the destruction and reduction of forest continued for revenue earning, joint hydro electric projects, road building (especially in mountainous and hilly region), conversion of agricultural land owing primarily to agriculture dependent population pressure, providing raw material to forest based industries, shifting cultivation and hordes of other causes.

The population pressure coupled with the accelerated rate of economic growth has widened the gap in demand and supply of forest resources which seems almost unbridgeable. According to a projection, in 2000 AD demand for firewood, timber, wood will be 225,000 Mm^3, 457,000 Mm3 and 77.70 Mm^3. In addition, needs of woody material for wooden crates, panel products and other wood based industries will also be substantial. These can not be met with the present levels of productivity of the forest stands.

Wastelands

Wastelands have been defined as lands where the production of bio-mass is less than its optimum productivity. Wastelands also refer to lands which are not being used upto their optimum productivity thus involving national wastage. For the purpose of National Waste Lands Development Programme, wasteland would mean degraded land which can be brought under vegetative cover, with reasonable effort, and which is currently under-utilised and land which is deteriorating for lack of appropriate water and soil management or on account of natural cause. Wasteland can result from inherent/imposed disabilities such as location, environment, chemical and physical properties of the soil or financial or management constraints. Such land would include gullied and/or ravinous land, waterlogged and marshy land, land affected by salinity/alkalinity—coastal/inland, shifting cultivation area, sand—desert/coastal, wateland arising out of mining and industrial activity and upland with or without scrub.

More than half of the total wasteland of 1295.80 million hectares in the country is in four states only, viz., M.P. (20.142 million hectares), Rajasthan (19.934 million hectare), Maharashtra 14.401 million hectare) and Andhra Pradesh (11.416 million hectare) (Table 3). Most of the wastelands are in non-forest degraded area and again most of it is the result of water erosion (Table 4).

Table 3

Estimates of Wastelands in India

(Area in Lakh hectares)

State/UT	Non-forest Degraded Area*	Forest Degraded Area*	Total
Andhra Pradesh	76.82	37.34	114.16
Assam	9.35	7.95	17.30
Bihar 38.96	15.62	54.58	
Gujarat	71.53	6.83	78.36
Haryana	24.04	0.74	24.78
Himachal Pradesh	14.24	5.34	19.58
Jammu & Kashmir	5.31	10.34	15.65
Karnataka	71.22	20.43	91.65
Kerala	10.53	2.26	12.79
Madhya Pradesh	129.47	71.95	201.42
Maharashtra	115.60	28.41	144.01
Manipur	0.14	14.24	14.38
Meghalaya	8.15	11.03	19.18
Nagaland	5.08	8.78	13.86
Orissa	31.57	32.27	63.84
Punjab	11.51	0.79	12.30
Rajasthan	180.01	19.33	199.34
Sikkim	1.31	1.50	2.81
Tamil Nadu	33.92	10.09	44.01
Tripura	1.08	8.65	9.73
Uttar Pradesh	66.35	14.26	80.61
West Bengal	21.77	3.59	25.36
UTs 8.89	27.15	36.04	
Total 936.91	358.89	1295.80	

Source : Societies for Promotion of Wastelands Development, New Delhi, 1984. *Barren area notified as forests not included in the above figures.

Table 4

Estimates of Wastelands in India

(Area in Lakh hectares)

State/UT	(Non-forest Area only) Saline & Alkaline Lands	Wind Eroded Area	Water Eroded Area	(Area in lakh hectares) Total
Andhra Pradesh	2.40	-	74.42	76.82
Assam	-	-	9.35	9.35
Bihar	0.04	-	38.92	38.96
Gujarat	12.14	7.04	52.35	71.53
Haryana	5.26	15.99	2.76	24.04
Himachal Pradesh	-	-	14.24	14.24
Jammu & Kashmir	-	-	5.31	5.31
Karnataka	4.04	-	67.18	71.22
Kerala	0.16	-	10.37	10.53
Madhya Pradesh	2.42	-	127.05	129.47
Maharashtra	5.34	-	110.26	115.60
Manipur	-	-	0.14	0.14
Meghalaya	-	-	8.15	8.15
Nagaland	-	-	5.08	5.08
Orissa	4.04	-	27.53	31.57
Punjab	6.88	-	4.63	11.51
Rajasthan	7.28	106.23	66.59	180.01
Sikkim	-	-	1.31	1.31
Tamil Nadu	0.04	-	33.88	33.92
Tripura	-	-	1.08	1.08
Uttar Pradesh	12.95	-	53.40	66.35
West Bengal	8.50	-	13.27	21.77
UTs	0.16	-	8.73	8.89
Total	71.65	129.29	736.00	936.91

Source : Society for Promotion of Wastelands Development, New Delhi, 1984.

Water logged areas fall into two broad categories : where waterlogging has resulted from surface flooding and where it has been caused due to rise in water table. Surface flooding is common in Assam, Bihar, Kerala, Punjab, Haryana, U.P., Tamil Nadu and West Bengal. Water logging due to rise in the water table is prevalent in Haryana, Punjab and U.P. (Table 5). State-wise distribution of gullies and Ravinous area, Alaki and saline soils and shifting cultivation area is presented in Table 6, 7 and 8 respectively.

Table 5

State-wise Details of Waterlogged Area

	State/UT	(Area in '000 hectares)
1.	Andhra Pradesh	64.0
2.	Assam	30.3
3.	Bihar	128.7
4.	Haryana	25.9
5.	Jammu & Kashmir	6.1
6.	Kerala	22.3
7.	Orissa	17.0
8.	Punjab	45.0
9.	Rajasthan	21.5
10.	Tamil Nadu	44.5
11.	Uttar Pradesh	210.1
12.	West Bengal	234.3
13.	Andaman & Nicobar	2.0
14.	Arunachal Pradesh	0.4
15.	Delhi	0.9
	Total	853.0

Source : Government of India, Ministry of Agriculture.

Table 6

State-wise Distribution of gullies and Ravinous Area

(Area in Lakh hectares)

Sl. No.	State	Ravine area
1.	Uttar Pradesh	12.30
2.	Madhya Pradesh	6.83
3.	Rajasthan	4.52
4.	Gujarat	4.00
5.	Maharashtra	0.20
6.	Punjab	1.20
7.	Bihar	6.00
8.	Tamil Nadu	0.60
9.	West Bengal	1.04
10.	Orissa	1.13
11.	Himalaya foot-hills (including Assam & Hinachal Pradesh)	1.93
	Total	39.75

Source : Government of India, Ministry of Agriculture.

Table 7

State-wise Distribution of Alkali Soil and Saline Area (including coastal saline sandy areas)

(Area in lakh hectares)

Sl. No.	Name of the State/UT	Alkali Soils	Saline including conastal saline sandy area	Desert
1.	Andhra Pradesh	0.64	1.76	-
2.	Bihar	0.04	-	-
3.	Gujarat	9.42	1.00	7.04
4.	Haryana	4.50	0.76	14.00
5.	Karnataka	0.76	3.28	-
6.	Kerala	-	1.17	-
7.	Madhya Pradesh	1.64	0.78	-
8.	Maharashtra	0.59	4.75	-
9.	Orissa	-	4.04	-
10.	Punjab	7.18	-	-
11.	Rajasthan	-	10.00	156.92
12.	Tamil Nadu	0.04	1.00	-
13.	Uttar Pradesh	11.00	11.95	-
14.	West Bengal	-	9.86	-
	Total	35.81	55.00	177.96

Source : Government of India, Ministry of Agriculture.

Table 8

State-wise Distribution of Land Under Shifting Cultivation

(Area in Lakh hectares)

Sl. No.	Name of the State	Area under Shifting Cultivation
1.	Andhra Pradesh	1.50
2.	Assam	1.39
3.	Bihar	0.81
4.	Madhya Pradesh	1.25
5.	Manipur	3.60
6.	Meghlaya	2.65
7.	Nagaland	6.33
8.	Orissa	26.48
9.	Tripura	1.12
10.	Arunachal Pradesh	2.10
11.	Mizoram	1.89
	Total	49.12

Source : Government of India, Ministry of Agriculture.

The remedial measures include a net work of drainage system, leaching of soil, adaptation of conjuctive use of canals and ground water resources, scheduling of water to provide optimal irrigation, raising of suitable species of trees etc.

The destruction of forests has a major import on the productivity of our crop lands. Soil erosion increased manifold and the soil literally gets washed away leading to an accentuated cycle of flood and drought. The degradation of watershed has already depleted the water flow in rivers, water falls etc. On accont of lack of recharging of underground water due to surface run-off of rain water, the underground rain water is progressively receding deeper and deeper. Large areas of the land have become drought prone due to overgrazing the cattle population virtually starves.

In some areas, the productivity of eroded soils can not be restored even at enormous costs (equivalent to the application of 2000 tonnes of quality soil per hectare, or 50 tonnes dry rotted cattle manure per hectare).

Soil Fertility Management

Soil loss also leads to nutrient depletion. One tonne of good agricultural soil may contain a total of 4 kg of nitrogen. 1 kg of phosphorus, 20 kg of Potassium and 2 kg of Calcium. Further erosion results in a loss of organic matter which plays a pivotal role in improving infiltration, water retention, soil structure and cation

exchange capacity. Organic matter and soil micro-flora and micro-fauna (including earth worms) are interdependent is maintaining soil quality and in promoting recycling of nutrients and degradation of wastes.

The loss of soil fertility due to continuous nutrient mining by crops without adequate replenishment—proses an immediate threat to food production and could result is a catastrophe no less serious than other forms of environmental degradation. While the use of mineral fertilisers is the quickest and surest way of counteracting nutrient depletion and boosting crop production, cost and other constraints frequently deter farmers from using them in recommended quantitives. Thus complementary use of available renewable sources of plant nutrients (organic/biological) along with mineral fertilisers is of great importance for the maintenance of soil productivity i.e. soil structure, soil bio-activity, soil exchange capacity and water holding capacity.

Results from various cropping systems and ecologies in relation to the use of farm yard manure, green manure and crop residues, legumes and biological nitrogen fixation illustrate the positive interactions resulting from the integrated use of both mineral fertilisers and organic/biological sources of plant nutrients within the frame work of integrated plant nutrient supply system (IPNSs).

The basic concept underlying IPMSs is the maintenance or adjustment of soil fertility and of plant nutrient supply to an optimum level for sustaining desired crop productivity through optimization of the benefits from all possible sources of plant nutrients in an integrated manner. The appropriate combination of mineral fertilisers, organic manners, crop residues, compost or N fixing crops varies according to the system of land use and ecological, soil and economic conditions. The cropping system rather than an individual crop and the farming system rather than an individual field are the focus of attention in this approach for developing IPMSs practices for the main agro-ecological zones.

Factors Affecting Land Degradation

(i) Deforestation

(ii) Overgrazing

(iii) Erosion—wind—water

(iv) Intensive agriculture

(v) Water logging

(vi) Salinization/acidification

(vii) Waste disposal

(viii) Mining

(ix) Natural disasters—drought, flood, earthquake

(x) Radio active pollution

(xi) Biological contamination

(xii) Recreation/Entertainment

Management of Land

(i) Soil and Water Conservation Measures

- Cotour bunding/cultivation

- Terracing
- Land Levelling
- Scattered trenches
- Gully plugs
- Check dams/spillways
- Anicuts

(ii) Afforestations

- Plantation (vegetative cover)
- Pasture development
- Wind breaks
- Embankment plantation.

(iii) Watershed approach

(iv) Soil fertility management (Integrated Plant Nutrient Supply)

(v) Integrated Pest Management

(vi) Integrated Farming System

(vii) Reclamation of problematic soils

(viii) Controlled/Rotational Grazing

(ix) Rehabilitation of mined area

(x) Recycling waste

(xi) Drought prone strategy

(xii) Flood control.

Programmes Related to Upgradation of Land Resources

- Drought Prone Area Programme (DPAP)
- Desert Development Programme (DDP)
- Hill Area Development Programme (HADP)
- Western Ghat Development programme
- National Wasteland Development Programme (NWDP)

- Integrated Watershed Management in the Catchments of Flood Prove Rivers (FPR)
- Soil Conservation in the Catchment of River Valley Projects (RVP)
- National Watershed Development Programme for Rainfed Agriculture (NWDPRA)
- Programme for reclamation of Alkol soils
- Project on control of shifting cultivation
- Project on Ravine reclamation
- Reclamation of saline including coastal saline areas.

Under each programme, sound and proven technology package is adopted to tackle problems of specific land. This may include land shaping, engineering structures, use of soil amendments and biological measures etc.

Role of Cooperatives in Upgrading Land Resource

Cooperatives directly and indirectly related to agriculture have also undertaken some programmes related to wasteland development, better management of land resource and adoption of environment friendly land management practices. Industrial cooperatives are also contributing to check land degradation primarily by controlling dischange of solid and liquid waste and also by creating green belts around their establishment.

As agricultural extension activities, IFFCO and KRIBHCO promote balanced and efficient use of fertilisers and other agro-chemicals and also emphasise on Integrated Nutrient Management approach in crop production. Activities in this direction include distribution of seed-cum-fertiliser drills, promotion of bio-gas, development of water shed, soil testing, reclamation of problematic soils—sodic and coastal area etc. In the community development programmes through village adoption emphasis is given to sanitation, family planning, tree plantation etc.

Rubber cooperatives, sugar cooperatives, oilseed cooperatives, dairy cooperatives have also taken up programmes related to conservation and protection of land resources.

IFFCO has also lunched a project to demonstrate the viability of afforestation on wastelands involving people through establishing farm forestry cooperatives. Till now 33 primary cooperatives societies have been organised, of which 29 have already been registered. In all, 4040 hectare wasteland has been put under green cover in the states of M.P., U.P. and Rajasthan since 1987.

National Dairy Development Board (NDDB) intiated a pilot project on Tree Growers Cooperatives in five states viz. Gujarat, Rajasthan, Orissa, Karnataka and Andhra Pradesh in 1986. By July 1991, there were 101 registered societies and 12 functional but not registered societies. Over 1000 hectare of land has been leased and over 175 million trees planted.

NCUI organised a national workshop on "Role of Cooperatives in Preservation and Protection of Environment" in July, 1985 and visualised following action programme for the cooperative to protect land and forest resources :

(a) Making arrangements for providing farm guidance to the members specially in regard to crop husbandary practices and use of inputs;

(b) To protect soil erosion by providing necessary financial support to the beneficiaries;

(c) The village level cooperative societies in collaboration with village panchayats may initiate programme on the land of their members;

(d) Organisation of social forestry cooperatives of land less agricultural labourers as wastelands in the villages;

(e) In urban areas housing cooperatives may undertake social forestry programmes in the settlements estabilished by them;

(f) Cooperative processing units e.g. sugar factories, spinning mills, oil mills may also motivate their members to undertake social forestry programmes, and

(g) Forest labour cooperatives should prepare well throughtout plan for the development of forest coupes allotted to them.

Subject VI Exploiting Renewable Energy/ Resources to Meet the Energy Requirements of Our Society

Exploiting Renewable Energy/Resources to meet the Energy Requirements of our society

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It is to be remembered that poor cannot be made richer by making the rich poorer. In order to narrow the gap between the rich and the poor, the per capita income of the poor, therefore will have to be increased. This can only happen if energy can be provided to each and every one at proper time and in adequate quantities as energy provides people with a wide range of services, such as, heating, cuting, cooking, lighting motive power etc. These services are essential for the survival of man and for meeting his day to day needs. Thus the availability and use of energy has powerful social impacts. Unfortunately about 50 percent of people in this world to-day do not have access to commercial energy and as such they are devoid of the comforts and services it brings.

From the day man started using energy from external sources up to about 18th century, almost all the energy requirements were being met from traditional sources such as human and animal power, wood, dung, farm residues, charcoal and utilising power of the winds and water power in small quantities. With the discovery of fossil fuels like coal, oil and gas the dependence on traditional sources decreased and the use of fossil fuels increased along with the increase in the utilisation of water power. It may be remembered that the energy of fossil fuels is stored as Solar Energy in plants and other living beings through the process of photosynthesis and buried underground for hundreds of thousands years. During last about 30 years the world's energy requirements have increased at the rate of 3.3 per cent per annum and still sufficient energy is not available to almost 50 percent of the population. Although even today the most energy is consumed by the developed world, the growth in demand has risen by about 50% in the developing countries in comparison to a growth in demand of around 14% in the developed world.

Most of the commercial energy requirements are met from fossil fuel resources. However, their reserves are limited and hence are expected to last only for a few more decades. Inefficient burning of fossil fuels and other organic matter like wood, dung cakes, farm waste etc. has adverse impacts on the environment. Apart from this removal of coal, oil and gas from underground has ecological consequences also. Thus the problems associated with the generation and supply of energy are many and there are no simple and easy answers to these problems. One thing is however clear that if we do not start thinking about finding answers to these questions now the future is going to be very difficult. A long range strategy with a view to put restrictions on the large scale utilisation of fossil fuel based technologies seems to be the only possible answer. This would require new approach, new thinking, open mindedness of policy planners and financing agencies, involvement of different category of people in decision making and implementation of programmes etc. In addition drastic changes in the old policies of governments and political support will also be required. It is equivalent to complete overhauling of a machine.

According to World Energy Council the "command and control" approach adopted by Government in so many fields has often yielded results falling far short of those intended. It may however be kept in mind while deciding a long range strategy that sudden move away from existing technologies mainly fossil fuel based technologies to new technologies may lead to massive dislocation. Therefore, a very centrally planned strategy is required to be evolved. In the decision making process different categories of people from our society need to be consulted and/or involved so that the final approach and strategy is not one sided and it becomes a strategy for the benefit of our people.

The Govt. of India had realised the importance of various renewable energy sources much before the Ist oil crisis in early 1973. However, a well defined three pronged programme was initiated only after the Commission for Additional Sources of Energy was created in early 1981 in the Department of Science &

Technology. These programmes got further boost after a new Department viz. the Department of Non-Conventional Energy Sources was created by the Govt. Today there is a separate Ministry to promote, coordinate, propagate and develop the technologies for harnessing various types of non-conventional energy sources.

During the last about 17 years very impressive progress has been made in each area. The low grade Solar Thermal Devices like Solar Cookers, Solar Water Heating Systems, Solar Air Heaters, Solar Dryers, Solar Wood Seaoning Kilns, Solar Stills etc. have been developed in the country and a very good industrial base has been created for the manufacture and marketing of these products. Solar cookers and solar water heating systems are in good demand. Even test standards have been evolved and are to be introduced shortly for quality control through BIS for flat plate collectors for water heating applications and box type solar cookers. Solar passive architecture is now gaining attention of design engineers, architects, construction agencies and users as well. Projects are being prepared to instal power plants through solar thermal route in the MW capacity. Solar thermal energy have many more applications for which several R&D projects are being funded by the Ministry.

In the area of Solar Photovoltaic applicators two public sector and one private sector organizations are already making Silicon Single Crystal based Solar Cells. There are several other parties who are engaged in making the balance of systems. The Ministry has also installed a pilot plant for making. Solar Cells based on amorphous silicon.

The Solar Cells being manufactured in the country are being used for variety of applications such as street lighting, domestic lighting, battery charging, signaling of railway crossings, powering of televisions, radio, T.V. antinas in remote areas, power generation, powering telephones in remote areas etc. In spite of the fact that the price of electricity generated with the help of solar cells is exorbitant they are in large demand. The Govt. have recently announced a programme for powering irrigation pumps using Solar PV Cells and also lanterns.

The biogas and improved wood burning chullah programmes are national programmes now. One can see these devices in almost all the villages, even in remote hilly regions of the country. These are not only saving fossil fuels but are also helping in improving the environmental pollution.

Wind and mini/micro hydro energy programmes have also become important now. Wind energy generators of total capacity about 56 MW already been installed. The mini and micro hydro energy systems are being installed in hilli areas and canal falls. These systems are best suited to meet the local energy requirements. Some of these technologies are so attractive that even international funding agencies like World Bank etc. have started providing funds for the same.

The other areas of importance are utilisation of waste materials like city waste, industrial waste, agro waste etc. for power generation, use of bagasse for power generation gassification of biomass, energy plantation etc.

It may be seen that a large number of technologies have been developed in the country to harness various new and renewable sources of energy. However, a lot more is yet to be done in this new area. The devices like solar cookers, chullhas, biogas plants, water heaters, street lights, battery chargers, biomass gassifiers etc. are small items and cannot compete with large power houses etc. However, these small devices are very important for those who otherwise may not get the taste of modern technology for many years to come. These are a separate class of technologies and hence need to be given equal importance, they should not be neglected by comparing with high technology based items and/or large power plants. These are the technologies which will alternatively save our society from disaster.

In order to spread the use of these new technologies in every nook and corner of the country, it is necessary to have the participation of different types of agencies, organisations, peoples etc. Peoples' education perhaps will play the most vital role in spreading their use. Unless and until the user is convinced about the usefulness of such a new technology he/she is not going to adopt it at any cost, even giving free. Quality control is another aspect, which is equally important. Apart from satisfying the Indian users, quality control will help in

marketing the product in the international market. It is therefore necessary to go for ISO-9000 series of Standards apart from getting ISI mark through BIS on various renewable energy based devices being manufactured in the country. The Ministry of Non-Conventional Energy Sources have already created regional test centres for testing solar cooker, flat plate solar collectors for water heating applications and improved wood burning chullahs. Standards are also being evolved for some photovoltaic based systems and wind generators etc.

In the area of non-conventional energy based technologies India may have to learn a lot from other countries where technology development has been done much faster than here. Some of the countries where some of these technologies are at a much advanced stage of development are USA, Japan, Germany, Denmark, Australia, Israel etc. In certain areas joint programmes have been envisaged. For the benefit of common people the countries of the G-15 group have launched a joint programme in this direction. Since a large number of technologies based on new energy sources like Solar Energy, Wind Energy, Ocean Energy, Geothermal Energy, Bio Energy etc. are environment friendly, it is expected that many more countries both from Developed and Developing World would come together to develop technologies for harnessing these energy sources. This type of cooperative energy programmes may lead toleration of peace in the world.

Subject VII Recycling of Wastes—Environmental Implications

Recyling of Wastes—Environmental Implications

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Man had been interacting with his environment since arrival on the scene. The interaction was quite harmonious in the beginning but deteriorated gradually with increase in human demands on the environment. Human activities at present are degrading the environmental system beyond repair and recovery. The recouperating abilities of the nature are being eroded. The abilities to recoup and withstand an adjustment to the disruptions in the natural system help in maintaining natural balance and functioning of the evironment. It is operating through use and reuse of materials and energy.

Environment

Our environment comprises living (biotic) and non-living (abiotic) components. The living part includes plants, animals and micro-organisms. The non-living or physical component comprises air, water, soil and climatic factors.

The planet earth comprises three spheres.

1. Atmosphere (air)
2. Hydrosphere (water)
3. Lithosphere (rocks & soil).

The life supporting region of the three spheres is categorised as biosphere. It comprises several small units called ecosystems e.g. pond, forest. Both living and non-living components constitute an interacting, inter-dependent structural and functional unit called ecosystem or ecological system and in more broader terms as environmental system.

Structure of Environment

The plants, animals and the microbes based on the food relationships provide a tropic structure to an ecosystem. The green plants prepare their food with the help of sunlight, CO_2, water and minerals. They are called autotrophs or producers. These plants are consumed by the animals who are not able to synthesize their food. The animals are known as herbivores or consumers. These animals are further consumed by other animals called carnivores or consumers of 2nd order.

The dead bodies of plants and animals are decomposed by the microbes (bacteria and fungi) and minerals are released to the soil. These microbes are called decomposers.

This food relation operates in a chain known as Food chain. Several food chains operating in nature involve living organisms and one organism may be involved in more than one chain. The net work of food chains in nature is called food web.

Functioning of the Environment

The interaction among the living and between the living and non-living components of the environment is reflected in two basic functions of an ecosystem or on a wider scale of the biosphere. These functions involve matter and energy.

- Flow of energy
- Cycling of minerals.

The flow of energy in the biosphere starts with capturing of sunlight by the green plants and its conversion into chemical energy (carbohydrates) through photosynthesis. The plants spend some of the energy as heat to the atmosphere and pass on some energy in food to animals consuming them. The same steps are repeated by the animals till the decomposers. One finds that energy released can not be reused in the process and hence a unidirectional flow of energy through living and non-living components.

The minerals cycling involves soil, plants, animals and chemicals and the cycles are called as Bio-geo-chemical cycles. As the terms indicates the cycling of minerals in an ecosystem or environment various minerals are taken up by the plants from the soil, they travel through plants, animals and are put back to the soil by the decomposers thus completing the cycle. The important elements such as carbon, nitrogen, oxygen, phosphorus, sulphur are involved in various cycles. The water cycle is an important cycle of the environment.

1. Carbon cycle
2. Nitrogen cycle
3. Oxygen cycle
4. Phosphorus cycle
5. Sulphur cycle

Recycling of Wastes

The recycling involves constructive use of resources available as byproducts of natural systems and also of human interaction with environment. The process of recycling increases the availability of mineral or raw-minerals with expenditure of less energy. It is in fact a environment friendly process. The recycling of wastes in more useful and economical way is based on :

- use of less energy
- pollution of less water and air
- disturbing less land
- use. of recycled materials instead of virgin minerals.

For example 50% increase in recycling of steel and tripled increase in recycling of paper can help in saving huge amount of oil energy. There are several factors which prevent adoption of environment friendly mechanism of recycling of wastes.

1. Rigid institutional forces who generally encourage use of raw-materials in the name of quality, prestige etc.
2. Higher transport costs for scrap.
3. High cost (labour) of sorting of wastes.
4. Lack of search for substitutes.

For Example : Copper replacement by aluminum, iron and steel by aluminum, chromium by plastics. Shift from metal or plastic to wood which is renewable resources.

Wastes in the Environment

In fact the environmental system uses and produces matter and energy. Both are used, released and may get accumulated in form of different wastes. If these wastes are not made reusable and properly disposed of (used or recycled) they may disrupt the functioning of the biosphere, which at present can be seen in several environmental problems particularly the pollution.

It may not be difficult to comprehend the term waste. We do contribute waste to the environment in one form or the other. It is done by individuals on a smaller scale, collectively its amount and kind may pose a problem for the community or society alongwith. Infact waste results from our body functions, functions of all human beings, and also of other organisms. Our activities add to waste and ultimately in waste accumulation in our environment. There are several factors which have enhanced the generation of waste. Affluence and the fast changing life styles and development, expanding knowledge of science and technology are some of the evident factors responsible for waster generation. In some environmental situations it is going beyond the assimilauve capacity of the natural system.

Nature of Waste

The wastes are the by-product of natural system resulting from its functioning. Also the wastes are product of human activities such as agriculture, industry, transportation and so on. Depending upon the place of occurrence of waste it can be categorise as :

- Rural wastes
- Urban wastes

The composition and potential for reuse of wastes differs in the rural and urban areas.

Wastes in Rural Areas

The wastes in rural areas are mainly agricultural residues with C, H, N as main constitutes. The calorific value ranges from 1-20 MJ/kg. Further these residues contain following components.

- Cellulose
- Hervicellulose
- liguin
- Ash
- Resin and wax
- Water soluble substances
- Moisture

The average fuel wood has following range of above components :

- Cellulose	-	33%
- Hemicellulose	-	13%
- Lignin	-	38%
- Moisture	-	12%
- Ash	-	2%

The crop residues like rice husk, rice, wheat straw, maize, stalks and others have high ash content, and low calorific value and are hygroscopic. In case of rice husk though it has high calorific value but it is only half that of coal.

The recycling of agricultural residues is mainly done through manuring, composit and obtaining energy through bio-gas and fuel. The studies indicate that energy obtained from 150 million tonnes of agricultural residues is equal to the energy obtained from 125 million tonnes of coal.

The potential of agricultural residues based on their availability is quite high as shown below :

Agriculture Waste	Potential/Year
Rice husk	15 million tonnes
Rice bran	2 million tonnes
Bagasse	5.3 million tonnes
Press mud	0.2 million tonnes
Saw dust	2.0 million tonnes
Cotton stalks	12 million tonnes
Mango peels	25,000 tonnes
Edible oil	2 tonnes
Tuba	34.5 tonnes
Jute stalks	3.5 tonnes

In addition animal wastes like dung, sewage are also available in rural areas for recycling and constructive use. Experiments have been done to obtain bio-methane from poultry droppings. It has been observed that cattle dung with poultry dropping provide more bio-gas.

Some other activities involving recycling in rural areas are :

1. Using paddy straw in mushroom cultivation.

2. Gainful utilization of earthworms in recycling through vermicompositing thus enhancing nutritional status of the soil. The technique provides an alternative use or disposal of agricultural wastes. This is also a low cost alternative to high energy involving inorganic fertilisers. The composit could be used in nursery raising, as fuel in bio-gas, food (microbial protein), feed in poultry and agriculture.

Most of the wastes in rural areas are bio-degradable and involve the decomposers. The recycling of rural wastes is less energy consuming with less pollution of land and water.

Urban Wastes

Urban areas generally accumulate wastes as solids on land as liquid in water (drain, sewage). Both kinds are the contributions or products of individuals as domestic wastes and of community level as municipal wastes.

The amount and kind of waste in urban areas vary from place to place, season to season and is largely determined by the growing population resulting from heavy migration.

In general the urban wastes contain following items from domestic as well as commercial sources like industries, transport.

- Paper
- Food
- Glass
- Plastic
- Wood
- Rubber, leather
- Textiles
- Aluminium and other metals

The urban wastes contain both bio-degradable and non-bio-degradable items. The reuse and recycling is expensive involving sophisticated technology. The urban areas are experiencing the problem of disposal of waste. The fast expansion of technology with industrial activities multiplying, the situation will be critical for waste management. The affluence and consumptive attitudes and life styles of urban people are adding more non-bio-degradable substances to the environment through waste accumulation. The evident examples are the use of plastics and other packaging materials. The technology for their recycling is yet not available and expensive also.

Disposal of Urban Wastes

There are many items in urban wastes such as paper, food, rubber which can be recycled and reused. The recycling practices add to several pollutants to air, water and soil leading to environmental degradation.

There are several disposal practices employed for waste disposal in urban areas. The reuse of solid municipal waste involve following steps.

1. Collection of wastes.

2. Sorting out the items like paper, glass, plastic, rubber or leather or wood. This is done manually only at the municipal level and not individual/family levels in case of domestic waste.

3. Shredding of the items. It is the process of breaking the items into smaller pieces.

4. *Faming* : It is done to separate lighter items like paper, fibres.

5. *Grinding or gritting* : The pieces of stones, wood are powdered through grinder and powder is mixed to soil.

The most common ways of disposal of solid waste in urban areas are :

1. Incineration or burning in dumps which are generally open. This practice is common in small towns and lot of pollutants such as CO2, particulate matter and gases are added to air as a results of burning. The disposal of ash formed during burning is also a problem. More over it creates sanitary problems.

2. *Landfills* : The landfill method is becoming common in big metropolitan towns. Sanitary landfills are being developed. There are several advantages and dis-advantages of landfill. The availability of land (space) the technology for utilization of landfill are important factors.

3. Recycling of items like paper, glass, metal and organic matter is necessary to prevent environmental degradation. For example paper and wood can be recycled for preparing paper and cardboard.

4. Dumping in water bodies urban wastes are dumped in oceans pond or low lying areas. Ultimately the pollutant chemicals and up in underground water through run off and leaching. About 15 million tonnes of solid and liquid wastes world over are dumped every year. This contains 80% drudge oil, 10% industrial waste, 9% sewage and 1% other miscellaneous materials. This results in death of living organisms in these water bodies due to entrophication and depleted oxygen.

5. Resource recovery method : In this practice useful products from the waste are recovered. For example energy from garbage and agricultural residues and using the remaining parts as manure.

Disposal of Hazardous Waste

The wastes of thermal and nuclear power plants and other research activities are hazardous not only

for human beings but can destroy other organisms because of their fast dissemination and action. Depending on the mode of generation, the radioactive wastes can be categorised into the following.

1. High level wastes : It is the used or spent fuel of power reactor.

2. Low level wastes : These are the radioisotopes resulting from mining and processing of uranium, medical and research labs, cancer treatment, contaminated glass, pipes, clothes, animal car casses, dry ash etc.

The main sources of radioactive wastes or pollution are weapons testing, uranium mining, nuclear power plant accidents. The radioactive hazardous substances are generally disposed of by shallow land burial.

The radioactive substances have longer decay period. The half life period of harmful chemicals (radioactive) range from seconds to tens of thousands of years. They persist not only few very long period but get magnified or concentrated while their transfers in the food chains. The mechanism in known as bio-magnification.

The safe disposal of these hazardous substances include the following steps.

1. ***Source reduction***

The practices involve reduction of radio active substances at source itself. For example evaporation of water in ponds and lakes helps in concentration and reduction in volume of hazardous substances in the water bodies.

2. ***Detoxification***

This involves chemical treatment for conversion of harmful toxic substance present in water bodies or soil. Adjustment of PH for acidic or alkaline toxic substances is done for reducing toxic effect. Oxidation reduction process also detoxifies the harmful chemical.

3. ***Bio-logical Treatment***

The use of bio-logical treatment reduces the use of chemicals in from of pesticides.

Waste Water

The water is a renewable component of the environmental system. 97% of the total water is held up in oceans. Out of the total water available major part about 70% is used in agriculture, 25% is put to industrial use remaining is used in residential and municipal activities.

Any interference in water cycle operating in nature would affect environment and the existence of life. Excess withdrawal at present is exceeding recharge and water table is falling further. It is heavy expenditure of energy and resources to use this water for agricultural purposes.

In urban areas the use of concrete and asphalt increases run off and reduces percolation of rainfall.

Waste water can be reused on a smaller scale, that is use of kitchen waste water for kitchen garden. But the wise and judicious use at the level of individuals, houses, community and institutions, the amount of waste water can be minimised. Since water is polluted by industries, domestic wastes, it is necessary to remove pollutants through water treatment and reuse the water.

There are several chemicals occuring as resource in waste water. These are the resources out of place. For zinc in waste water of rayon industry can be recovered and used.

The waste water can also be recycled through using water for more than one purpose in the same water cycle.

Subject VIII People's Participation in Environment Management

PEOPLE'S PARTICIPATION IN ENVIRONMENT MANAGEMENT

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How do we define environment ?

There are many possible ways of defining environment as it is a concept which is linked to the values and world view of each society and culture.

Environment includes :

- all the bio-physical components of the natural environment of land, water and air including the atmosphere, all organic and inorganic matter and all living organisms.

- all the components of human society, including social, economic, cultural, aesthetic and spiritual factors, physical and mental well being, security, justice and peace.

- the interactions of all the above components.

This definition essentially emphasizes the concept of ecological interdependence and idea of natural environment as a dynamic, self-regulating system. The varying perceptions of environment in different cultures and economic systems also is implicit e.g., nomadic tribals, urban industrial people, etc.

How do we define people's participation?

I prefer to refer this as the role of people to analyze, choose and experiment with alternatives to come up with what they recognize as the most appropriate to their surrounding.

At present most of the development processes are of closed blue print approach. They are mostly top down with rigid bureaucratic controls. Normal bureaucracy tends to centralize, standardize and simplify. They rarely take into account the hetrogenity and complexity within the system and therefore badly fit. What is needed is a reversal of role - starting with the people. One has to agree here that this not easy to start or sustain. The reversal of role means decentralization. Central controls need loosening if local actions are to fit diverse conditions. The essence then of decentralization is to serve and support local diversity.

Analysis by people takes many forms and can be provided in many ways involving outsiders to different degrees. The outsider can play a role of questioner, convener of a group, stimulator of discussion or a catalyst whose presence speeds up the process. The outsider role is to elicit, encourage, facilitate and promote analysis by people, providing wherever necessary the stimulus, occasion and the incentives for meetings and discussions. The outsider takes part but does not dominate. The people's own analysis, criteria and priorities come first.

Choice is important from the people's point of view. Analysis usually result in an agenda of requests for information and material. Second, people need a range of choice to pick up and choose to suit their conditions. The role of outsider in this is to search for and supply alternatives.

Experimenting with different principles and methods to suit their conditions and needs help people to satisfy their curiosity, to solve their problems and then adopt the technology. So what is provided is not a ready made package but a series of principles, practices and methods for them to test and use. The outsider supports and advises. Stimulating, servicing and supporting these activities - analysis, choice and experiment requires reversals of

normal and expected roles of outsiders. This does not mean that they have to be purely passive onlookers. It would be absurd if their ideas and knowledge are not brought to play. In raising questions, in providing tools for analysis, in presenting what they already know to be feasible and available choices and in supporting and advising, the outsiders have an active role to play.

Participation thus can be defined as an "active process by which beneficiary/ client groups influence the direction and execution of a development activity with a view to enhancing their well being". This definition implies a dimension that goes beyond benefit sharing to responsibility for project or program suitability.

Participation generally serves one or more of the following objectives:

- To share or recover costs.
- To increase effectiveness of a developmental activity.

- To build beneficiary capacity.
- To achieve empowerment - or the capacity to initiate action and to influence the process and outcomes of development.

Why do we need people's participation ?

Let us see how this process can be studied using an agricultural project.

The project goal is to develop and sustain improved agricultural practices.

The top down project need is designed by the technocrats /scientists. A set of improved agricultural practices that can increase substantially yield are to be demonstrated at the farm level and it is hoped that this would change the farmers attitudes and would help him to achieve high yields.

Soil conservation is one aspect of the production technique. The scientists and administrators recognize that by poor soil management, the precious top soil is being eroded and lost. The final outcome of this is lower and lower crop yields. To avert this the Government of India has been treating lands to conservation measures - like bunds, water way checks etc. However, most of these structures are not maintained by the farmers. The farmers complain that the bunds generally divide their fields to smaller units impossible to cultivate, the checks in the waterways obstruct the movement of carts, etc. They named all these as "government programs" which has no involvement from them.

These days the awareness that unless the farmer is involved, the structures perish fast is recognized. This has helped to modify the structures keeping in view farmers' need. The concept of keyline farming, boundary bunds with provision for excess water removal, checks in nalas over years etc., have helped to increase the life span of the structures. Also the farmers recognize that the precious top soil is preserved along with the inputs added like fertilizer.

How to ensure people's participation ?

A multitude of participatory approaches have been developed and applied to a diverse range of conditions and needs, initiated by various government and non-government organizations. Approaches and strategies span a broad spectrum of levels and types of interactions.

Some of the salient inputs into these model are discussed here:

Many professionals assume they know what the people want and need but are often wrong. Not knowing what the traditional practices are and not putting people's agenda's first means the professionals are likely to address the wrong problems. Conversely identifying the practices and helping people to meet their felt needs leads to innovations which are adopted.

To put peoples agendas first requires diagnosis in which the people take part in analysis. The professionals respect people and vice versa. In order that successful development takes place, a process by which people can develop their own resources is to be encouraged. This means the goal should be to train and motivate for innovations as they go along. This process increases villagers' dignity, converts extension into communication and increases the quality and range of appropriate technologies.

Speaking 'with' instead of speaking 'to' is the next approach. Social scientists can provide effective and efficient complimentary techniques, case studies, surveys, help to point issues.

One of the other important methods used in agricultural research was group appraisals. Individual information received from farmers are refined in group meetings. To follow up a loose end and trying to reconcile contradictory findings, a sub-group walks through the disputed areas and come to a consensus of prioritized list of farmer problems. What this provides in essence is a first hand knowledge of the existing situation, the farmers' preferences and opinions and conflicts that are likely to surface between research/extension people and farmers on the other. This also includes a social survey to get the profile of social economic considerations.

Another attempt (tried again under agriculture system) is diagrams for communication. A diagram is any simple schematic device which presents information in a readily understandable visual form. Diagram can radically simplify complex information, making it easier to communicate and analyze. Diagrams have three major advantages over most other forms of investigation.

- The questions and answers are more open-ended. In diagrams, the general subject area may be preset but the details have to be filled in by respondents, giving primacy to their knowledge and perceptions.

- Diagrams can capture and present information which would be less clear, less precise and much less succinct if expressed in words.

- Diagrams are shared information that can be checked, discussed and amended.

Different types of diagrams used are maps, transects, calendars, flow diagrams (can elicit and present sequences with key aspects alongside like labour, monetary costs, etc.) and venn diagrams (for understanding institutional relationships in a village). Even in quite small villages, the number of different institutions and actions involved in decision making can be considerable. These can be identified and diagramed at a meeting of villagers or of a particular group. Venn diagrams use touching or overlapping circles of various sizes. Each circle represents an individual or institution and the size of the circle indicates the importance (which can be discussed by the group undertaking the exercise). The circles can be used to indicate the degree of contact or overlap in terms of decision making. Overlap occurs if one individual or institution asks another to do something or if they have to cooperate. Separate circles means no contact,

touching circle indicates that information is exchanged. Small overlaps point to some cooperation in decisions and large overlaps means considerable cooperation. This whole exercise of diagrams help for eliciting the knowledge of rural people and for analysis by and with them.

The dimensions missing from most developmental works is the basic personal attitude of the outside professional and the person "receiving" the benefits. Often there is an underlying conviction that the modern specialized knowledge of the outsider has a universal validity and application. The attitudes, behaviour and dimension that go with this belief prevent from learning from 'others' - reversals of the behaviour - respect and desire to learn from the "beneficiaries" are essential components of the participatory approach.

What Do We Hope to Achieve

Thus, the participatory approach is not just talking to the people. It involves much more. Discussions at planning of the project, during implementation and monitoring are essential for *sustainable development*. It may take time to win the confidence of people and be "one" among them.

"Sustainable development" is defined in many ways. The World Commission on Environment and Development defined sustainable development as "development which preserves the quality of environment so as to ensure a prosperous economy and well being for our society and future generations. Thus sustainable development is not a fixed state, but rather a process of change in which the exploitation of resources, the direction of investment, the orientation of technological development and institutional change are made consistent with the future as well as the present needs. Sustainable development as a goal rejects policies and practices

that support current living standards by depleting the productive base, including natural resources and that leaves future generations with poorer prospects and greater risks than our own.

Sustainability is dependent on there being no depletion of the total natural capital, if possible, it should be increased. If this objective is to be achieved in practice:

- human activities must be kept in within the framework defined by the necessity of maintaining the remaining natural capital.

- technological development must be synonymous with greater efficiency, rather than increased use of raw materials.

- renewable natural resources must not be extracted faster than they are replenished.

- pollutant emissions must not exceed what nature can cope with.

- More renewable resources may be exploited but only on such a scale that their replacement is ensured by the formation of renewable resources.

The deteriorating condition of our environment and ecology needs concerted activities of all human beings to prevent and protect the environment. The major cause of continuing deterioration of global environment is the unsustainable pattern of production and consumption. Through participatory approach the researcher/policy maker and the "people" at large can save the world. Women have a vital role in environment management and development. Indigenous people/local communities also have a vital role in environmental management as their traditional practices have been very eco friendly. States should recognize and duly support and enable their active participation in the achievement of sustainable development.

The tendency in development planning has been to concentrate on technique and products rather than the people and social arrangements through which they use the resources. It is now increasingly apparent that social arrangements must be placed at the centre of project planning as the means thorough which resource management can be improved, conservation strategies can be applied and inputs can be directed to where it is needed most.

Local conditions of resource use have led to growing recognition of the need to strengthen local capacities for resource management. Because of the importance of involving all users in responsibility for local resource use, local institutional development must be concerned with the participation of all social groups in any organizational arrangements affecting resource use.

Relations between users, with the physical environment and with other social components of their societies are embodied in social institutions. Institutions are therefore the key to change in resource use, for it is through them that people decide on the use of resources.

Primary Environmental Care.

Primary environmental care is yet more a goal than method. PEC developed in Italy, draws on experience from other participatory approaches, such as Integrated Rural Development, ecologically sound agriculture in resource poor rural environments, community based action research and primary health care, to support environmental management activities addressing the root causes of environmental degradation.