One notable feature of Indian agriculture has been the advances made in the last few decades through sustained research. These efforts provided a spectrum of technological options which facilitated a set of policy initiatives to combat the severe drought of 1987. Keeping in view the inherent potential of growing technology, foodgrain production targets were worked out for *kharif* and *rabi* of 1987-88. The intrinsic capacity of technology rendered it feasible to minimise the fall in the production during *kharif* 1987 and achieve a higher *rabi* production even in the face of the drought. The Indian Council of Agricultural Research (ICAR) through its All India Coordinated Research Projects and Institutes and through the cooperation of State Agricultural Universities developed several valuable technological options responsive to varied cropping situations and production systems to put the required dynamics into production strategies and thus enable the country to tide over the difficult situation.

1.2 Besides foodgrains, cereals, pulses, oilseeds and horticultural crops, technological packages had also been evolved for development of forage resources during the drought of 1987. This drought caused considerable problems in raising fodder crops successfully due to late onset of monsoon. Contingency fodder production projects during the *rabi* season were recommended envisaging early planting of fodder crops and fodder production in non-conventional area. Packages were also evolved for fodder production in the temperate and tropical grass lands/forests and new projects were suggested for efficient utilisation of crops residues. Herbage based rations with essential nutrient ingredients were recommended for livestock in the fodder scarcity areas.

1.3 Besides the development of technologies for higher agricultural and fodder production, science and technology helped in combating the drought of 1987 and for evolving more effective stategies for the future. The programmes and projects undertaken during the drought of 1987 are described below.

2. *Cloud Seeding Programme:* Warm cloud modification experiments were carried out by Indian Institute of Tropical Meteorology (IITM), Pune in Maharshtra during the past 11 years (1973, 1974, 1976, 1979-86). Formulation of cloud seeding programme envisaged undertaking cloud seeding

operations in 2 to 3 states initially. The Institute's allocations for the Seventh Five Year Plan for weather modification work was also to be used for the programme.

3.1 *All-India Coordinated Project on Water Management, Health and Sanitation:* The Department of Science and Technology is implementing a scheme entitled "Science and Technology for Women" which is aimed at improving the life of women through the application of science and technology. In view of the fact that the country was facing drought conditions and recognising that water and sanitation were major problems faced by women, an All India Coordinated Project was initiated on water management, health and sanitation which looked into the crucial problem of water, its conservation, purification, storage and other related aspects of hygiene and sanitation.

3.2 Four regional coordinators were indentified who held meetings with voluntary organisations with a view to formulating projects for their respective regions. An advisory body rendered advice regarding the overall coordination and evaluation of the programmes and for evolving an strategy for the management of water resources for domestic purpose and for issues relating to health and sanitation as also for identifying the science and technology efforts necessary for putting them into action. The advisory body met and recommended that a software package for conducting training programmes relating to water management, health and sanitation practices should be prepared and its cost worked out so that training programmes can be initiated by different voluntary organisations. Besides this, projects were also funded to develop and standardise the techniques for harvesting rain water, for re-cycling waste water and for purifying and storing water for drinking purpose in rural area.

4.1 *Identification of Hydrogeology as a Thrust Area:* The Department of Science and Technology (DST) identified several thrust area through a series of seminars about eight years ago for intensive support of research and design (R & D) through the Science and Engineering Research Council (SERC). Hydrogeology was identified at that time as a thrust area of research.

4.2 During the last decade and half, the concepts and understanding of hydrogeology have under gone change. Hydrogeology is not considered any more as a resource science. It has been redefined as a "process science." Instead of considering the available ground water as a resource, most of the studies are now being done based on the concept of the total underground "reservoir space" as the resource. This concept is very relevant and important to a country like ours where the rainfall occurs in a peaked monsoon precipitation. In order to invite specific research proposals in this important area, the DST identified hydrogeology as a thrust area of research under the SERC.

5 *Automation of Weather Data Collection:* Conceding the need for providing automation in the existing data collection system of rain gauges, snow gauges, etc., it was felt necessary to prepare a feasibility report on this aspect. Therefore, the DST approved a programme for establishing mini-weather stations, including automation of rain and snow gauges. Under this programme, it is contemplated to have telemetered network of mini-weather stations collecting on-line data from different regions of the country in consultation with the India Metereology Department (IMD).

6.1 *Ground Water Exploration using NME based Hydroscope:* Water prospecting was one of the major area identified for collaboration in the Indo-USSR science and technology cooperation agreement. In pursuance of this, the DST signed an *aide memoire* on 23rd June, 1987 with the Institute of Chemical Kinetics and Combustion, Novosibirek. The *aide memoire* envisaged demonstration in India of the NME based Hydroscope developed in the Soviet Union and joint venture in producing this equipment. The hydroscope is an instrument which is claimed to have good success in detecting ground water to a depth of about 50 to 100 metre without having to drill bare holes. The computer software developed by the Soviet scientists is capable of projecting the depth of water bearing zones and their effective porosity.

6.2 An Indian team comprising the Mission Director and representatives of CGWB, National Geophysical Research Institute and DST visited Novosibirek in September, 1987. Following their discussions, a Soviet team visited India during December, 1987 to January, 1988. The hydroscope was field-tested in different geological conditions. About three cities per day were covered for water prospecting using this equipment. From the experience gained during this demonstration programme, it was observed that the instrument is highly sensitive to EM disturbances. It was also not able to locate water available in solution channels in limestone aquifers. Its value is also limited in Deccan trap areas. The ambient temperature for operation should be ideally less than 30° celsius.

6.3 At many of these sites where the instrument was tested, the recorded water bearing capacity of the formations has been too low. Ramanathapuram in Tamil Nadu recorded a zone at 45 metre with an effective porosity of 25 per cent. From the preliminary results obtained so far, it can be surmised that the instrument is still in a developmental stage and there is good scope for R & D work between some of the Indian Institutes and the USSR.

7.1 *Setting up of National Agricultural Drought Assessment and Monitoring System* (NADAMS): The National Remote Sensing Agency (NRSA), Department of space, Hyderabad, has established a districtwise drought assessment and monitoring system for providing an early warning of an emerging drought situation. The NADAMS is based on an analysis of both vegetation index map and greenness map as well as vegetable index statistics produced under the Remote Sensing Application Mission on Drought sponsored by the DAC.

7.2 *Utilisation of National Remote Sensing Drought Management System (NRDMS) for Mitigation*: For systematic and scientific management of drought it is essential that the phenomenon of drought is viewed in a systems context wherein the close inter-play of physical events and social responses can be studied. It is, therefore, intended that a drought assessment and response system (DARS) should be developed which will be operational even during the normal times and act as an early warning/triggering mechanism for drought mitigation. The principal objectives of NRDMS would be:

(a) to provide timely and systematic data on drought related parameters;

(b) to establish criteria for start up and shut down of various assessment and response activities by official agencies;

(c) to outline a system that ensures information flow and defines duties and responsibilities of various agencies; and

(d) to continuously upgrade the methods of assessing impact of drought and response system.

7.3 The proposed system will include data on physical environment and socio-economic parameters and data on geo-coordinates. The data on physical environment will encompass soil characteristics, cropping pattern, land holdings, area cultivated, fodder resources, ground water acquifers, surface water resources, meteorological data, etc. The socio-economic data will include demographic information, health, nutritional status, prices, foodgrains, seed availabity, infrastructure, migration etc. A small group has been formed for working.out the modalities for utilising NRDMS for drought mitigation.

8 *Improved Technique of Medium Range Weather Foreacasting:* The GOI approved the project for the establishment of a National Centre for Medium Weather Forecasting and Development of agrometeorological Services. The supercomputer has been procured and installed. It is expected that this system will be operationalised soon and a nucleus of scientists positioned to develop the medium range weather forecasting system. It would take about 3 to 5 years after the installation of supercomputer and the numerical weather prediction model to issue medium range weather forcasts on operational basis for a period of validity of more than 3 days.

9.1 *All India Integrated Project on Arid Zone Research:* The project is an inter-institutional collaborative programme adopting multidisciplinary approaches to enhance the productivity of land, man and animal in the arid regions. The Project Advisory and Monitoring Committee approved nine projects under the programme from various R & D institutions which are as follows: (1) Monitoring desertification and establishment on natural resources data base for selected northern districts; (2) Natural resources data management system in arid lands of southern India; (3) Studies on dune topography and dynamics of dune vegetation in Indian deserts; (4) A study of consumer system and exploitation of vegetation by man in some districts of Rajasthan; (5) Microclimate modification studies in arid zone of Punjab; (6) A study of growth and water use simulation submodels in pearl millet; (7) Restoration of Aravalli range of mountains in the arid zone of Rajasthan; (8) Quaternary geology, geomorphology and environment dynamics of the arid frontier in Rajasthan, and (9) Assessment of spread of sandy desert through Aravalli gap.

9.2 A programme on the studies on the environmental impact of Indira Gandhi Canal Project and greening of Aravallis is being evolved. A programme on cold arid zone is under consideration in consultation with concerned Ministries, State Governments and other R & D institutions.

10 *Integrated Weather Service for Agricultural Operation and Planning:* IMD is issuing forecast for the agriculturists from 9 advisory centres. With the establishment of additional agrometeorological field units (AMFUs) in a phased manner the service will be available from 127 centres. Each AMFU will cover 3 to 4 districts corresponding approximately to a homogenous climatic zone. It is expected that the implementation of this project will help in improving agricultural production through use of weather based agricultural practices.

11 *Crop Weather Relationship:* Three Evapotranspiration stations at Hebbal, Anand and Rahuri have been upgraded for crop weather relationship studies. Two more evapotranspiration stations are proposed to be upgraded during 1988-89.

12 *Evapotranspiration Observatories:* Four evapotranspiration stations at Tirupathi, Dantiwada, Durgapur and Bhopal have been established during 1987-88. These stations will be commissioned during the year 1988-89.

13 *Soil Moisture Observations:* Four soil moisture stations are already in operation. Eleven more soil moisture stations were to be established during 1987-88.

14 *Monsoon Activity Centre:* A nucleus has been set up at the IMD headquarters in New Delhi.

15 Besides, programmes/projects on long range dynamic forecasting, districtwise rainfall summary, world climate programme and limited area modelling programmes have been evolved by the IMD and are under various stages of approval/implementation.

15 ROLE OF VOLUNTARY ORGANISATIONS

The role of voluntary organisations in drought is to help people to overcome the difficulties posed by drought by providing welfare and relief services according to the specific needs of the people, to work as ears and eyes of the people and also act as an intermediary between the people and the Government to aviod duplication, to improve proper distribution of scarce resources and to organise vigilance groups for prevention of misuse of resources. Voluntary organisations can also initiate innovative measures and take action against drought which can help in its mitigation through creation of awareness and preparedness amongst the people, propagation of water harvesting techniques and maitnenance of assets and promotion of spirit of self-confidence to deal effectively with the situation.

1.2 Action programmes to be taken up by the voluntary organisations should be based on understanding of the causes and overall destructive effect of drought on the people and the area and the existing governmental programmes. Organisational capabilities and availability of resouces should also be taken into consideration while planning and initiating the programmes. Involvement of local people and their organisations should form the key to the approach. The programme can be broadly divided into two categories, namely, relief and developmental, which could be individually or simultaneously undertaken to reduce the impact of drought.

1.3 The relief programmes undertaken by voluntary agencies are basically designed to sustain life and reduce the sufferings of the people. A list of some of the activities which are undertaken under drought relief programmes are: (i) making people aware of different relief activities initiated both by government and non-government agencies and help them avail of these facilities; (ii) supply of drinking water for human beings and animals; (iii) generation of employment opportunities in the drought affected villages; (iv) opening and running of fair price shops; (v) opening of free feeding centres and distribution of nutritional foods and vitamins to prevent malnutrition; (vi) adoption of families of drought affected areas; (vii) organisation and running of first aid centres, health camps and immunisation camps; (viii) Opening of cattle camps; and (ix) Organising supply of fodder free or on subsidized rates.

1.4 The development programmes are aimed at creating durable assets which would help in facing calamities like drought in the long run. These programmes are beneficial to the weaker sections of society. These programmes are labour intensive and provide opportunities of new employment. The programmes would result in creation of community assets which offer timely help in facing drought. The development work should also include following:

(i) Increasing awareness of the people with regard to afforestation and plantation of trees, proper and scientific use of water and other sources of energy and building awareness against indiscriminate felling of trees. The voluntary organisations should cultivate an understanding amongst the people that the drought may be a recurring phenomenon and they should prepare themselves to minimise its impact. This may include cultivation of drought- resistant and durable varieties of crops and maintenance of traditional methods of irrigation;

(ii) Voluntary organisations working in area not affected by drought may produce fodder and supply to drought affected area to save cattle and other livestock; and

(iii) Community assets should be created during the drought period which may include, (a) afforestation, social forestry and land reclamation and levelling, (b) construction and repair of wells, tanks, reservoirs and ponds, (c) deepening of existing wells, water tanks to increase water reservoir capacity, (d) creation of minor irrigation facilities, small earthen dams for soil conservation (e) conducting soil surveys for land shaping and soil conservation projects (f) building, and (g) repair of roads.

Voluntary Action

2.1 The efforts of voluntary organisations in drought affected States of Rajasthan, Gujarat, Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and Kerala were mobilised in a significant manner to combat drought situation. The yeoman's service rendered by voluntary agencies in the States of Gujarat and Rajasthan deserves particular mention.

2.2 Gujarat has a rich tradition of voluntary action for providing relief in times of natural calamities. The voluntary agencies work shoulder to shoulder with the State Government to mitigate the distress amongst the affected population. The State Government also extended several facilities to the voluntary agencies to enable them to carry out relief activities smoothly and speedily. Some of these facilities are detailed below:

(1) The State Level Relief Committee was formed under the chairmanship of Chief Minister for securing and coordinating voluntary efforts for relief. This Committee included representatives of leading voluntary agencies to advise on relief operations.

(2) The State Government set up a coordination committee of voluntary agencies headed by the Revenue Minister to specifically coordinate various relief activities of voluntary agencies to combat drought. A non-official of high standing was appointed as the executive chairman of this committee.

(3) A separate post of Director, Voluntary Agencies, was created exclusively to ensure that the efforts of the voluntary agencies were focussed on areas where they were needed most.

(4) Maintenance subsidy was being paid at the rate of Rs. 3.50 per cattle per day to the voluntary agencies running cattle camps.

(5) Subsidy was being paid to the *pinjrapoles* and *gaushalas* at the rate of Rs. 2.25 per cattle per day. This rate was increased to Rs. 3 per cattle per day from 1st January, 1988.

(6) Free veterinary services were provided to the cattle maintained in the cattle camps, *pinjrapoles* and *gaushalas*.

(7) Subsidy equivalent to the concessional railway freight was paid to voluntary agencies bringing grass by railway from outside the State for distribution in the affected area.

(8) Subsidy at the rate of Rs. 1.93 per kilometre or at the rate of Rs. 2.13 per kilometre depending upon the carrying capacity of the trucks, was paid to the voluntary agencies for transportation of fodder by road by the voluntary agencies for distribution in the affected area.

(9) Subsidy at the rate of 50 per cent of the cost of skimmed milk powder subject to a maximum

of Rs. 20 per kg. of skimmed milk powder was paid to the voluntary agencies distributing butter milk to the labourers and others in the area.

(10) Subsidy at the rate of 33-1/3 per cent of the cost of sugarcane was paid to the voluntary agencies in respect of distribution of sugarcane for the cattle of the affected area.

(11) Subsidy at the rate of 32 paise per tonne per kilometre was paid in respect of transporation of sugarcane for distribution of sugarcane in the affected area.

(12) Interest-free loans were provided to the voluntary agencies from the Chief Minister's Relief Fund. In 1987-88 interest-free loans amounting to Rs. 3.60 crore were granted to 30 voluntary agencies.

(13) The maximum limit of admitting only 3 cattle per agriculturist family in the cattle camps was removed. As a result any number of cattle belonging to agriculturists of the affected area were entitled to be admitted into the cattle camps. Similarly, the maximum limit of admitting upto 10 cattle per *maldhari* was also removed.

(14) It was decided to give maintenance subsidy for cattle which were abandoned by their owners and which were then being maintained in the cattle camps.

(15) Arrangements were made to provide molasses to the voluntary agencies manufacturing cattle feed for the cattle in their camp.

(16) Arrangements were made to supply damaged wheat at subsidised rates from FCI godowns to the voluntary agencies running cattle camps through subsidy at the rate of 40 paise per kg.

(17) CAPART gave interest-free loans for sinking of tubewells for irrigation purpose to the *gaushalas* and *pinjrapoles* of the affected areas.

(18) With a view to enable the voluntary agencies running cattle camps in more than 2 districts to get maintenance subsidy promptly, arrangements were made to make payment to them directly from the office of the Director of Voluntary Agencies, Ahmedabad.

2.3 The main problem in 1987-88 was that of saving the cattle from starvation. The voluntary agencies therefore set up cattle camps on a very large scale. Most of the cattle camps which were started by the voluntary agencies in 1986-87 were continued by them in 1987-88. Many more cattle camps were also started by several voluntary agencies for the cattle of Kutch, Rajkot, Junagadh, Surendranagar, Bhavnagar, Ahmedabad and Jamnagar and other affected area. 1655 cattle camps were in existence at the end of May 1988 and 12.55 lakh cattle were being maintained there.

2.4 In the past cattle camps were being run by the voluntary agencies for about 4 to 6 months. But in 1987-88, these cattle camps were run for about 10 months i.e. till the end of July 1988. The details of cattle camps set up by the voluntary agencies may be seen in Table 54.

2.5 Moreover about 1.60 lakh cattle were maintained by 343 *gaushalas* and *pinjrapoles* in the affected area. Approximately 30 lakh tonne of dry and green fodder was utilised by the voluntary agencies on these cattle camps. Total expenditure incurred by the voluntary agencies for maintenance of these cattle is estimated at Rs. 195 crore out of which Government subsidy (including transport subsidy) is estimated at Rs. 155 crore and expenditure incurred by voluntary agencies from their funds is estimated at Rs. 40 crore.

2.6 Apart from running cattle camps voluntary agencies carried out other relief activities like: (1) running of free feeding centre, distribution of fodder, cattle feed, etc., (2) distribution of foodgrains; (3) running of free/subsidised kitchens; (4) distribution of buttermilk; (5) deepening the wells of farmers for agricultural purpose; (6) sinking of tubewells for drinking water purpose; (7) growing of green foodder/encouraging farmers to do so by providing them seeds, fertilisers,. etc.; (8) distribution of drinking water by tankers; (9) construction of water troughs; and (10) distrubition of medicines, vitamin tablets, clothes, etc.

3.1 In Rajasthan voluntary agencies were involved in a big way to procure fodder from neighbouring States and distribute it in the scarcity districts of Rajasthan on a no-profit no-loss basis. The District Collectors were directed to motivate the voluntary organisations to play a leading role in this measure. As many as 3,536 fodder depots were opened by these voluntary agencies in Rajasthan

Table 54: Cattle Camps set up by Voluntary Agencies in Gujarat, 1987-88

S.No.	Voluntary Agency	Number of Cattle Camps	Cattle Population	Districts Covered
1.	Bhansali Trust, Radhanpur	213	1,67,000	Banaskantha, Sabarkantha, Mehsana, Bharuch Panchmahal, Bhavnagar, Surendranagar, Kutch and Ahmedabad.
2.	Gujarat Rahat Samiti, Ahmedabad.	128	1,30,000	Kheda, Rajkot, Banaskantha, Jamnagar, Mehsana, Bhavnagar and Kutch.
3.	Sankat Nivaran Society, Ahmedabad.	143	94,000	Ahmedabad, Mehsana, Sabarkantha, Banaskantha, Bhavnagar and Surendranagar.
4.	Gujarat Mahajan Pinjrapole Federation, Surendranagar	71	70,000	Ahmedabad, Rajkot, Amreli, Surendranagar, Junagadh and Kutch.
5.	Rajkot Jilla Dushkal Rahat Trust, Rajkot.	4	45,000	Rajkot.
6.	Madan Mohanji Haveli Trust, Junagadh.	128	35,000	Junagadh and Rajkot.
7.	Jilla Sankat Nivaran Samiti, Surendranagar	29	34,000	Surendranagar and Surat.
8.	Jilla Rahat Samiti, Surendranagar	30	32,000	Surendranagar
9.	Sarva Jiva Sangh, Kutch	42	30,000	Kutch and Bulsar.
10.	District Cooperative Milk Producers' Union, Surendranagar.	44	30,000	Surendranagar.
11.	Jambusar Taluka Cooperative Purchase and Sales Union, Jambusar.	28	30,000	Bharuch.
12.	Vardhman Seva Kendra Bombay, and Akhil Bhartiya Hinsa Nivaran Sangh, Ahmedabad.	NA	19,000	Ahmedabad.
13.	Sorath Seva Samiti, Kutch, and Junagadh.	17	17,000	Junagadh.
14.	Sardar Vallabhabhai Patel Kelvani Mandal Trust, Dhasa Junction, District Bhavnagar.	NA	12,000	Bhavnagar.
15.	Ajmela Trust, Gondal	1	12,000	Rajkot.
16.	Jetpur Rahat Jetpur.	3	11,000	Rajkot.
17.	Sitaram Seva Trust, Ahmedabad.	2	10,400	Ahmedabad.
18.	Sapakda Mahajan, Sapakda, Surendranagar	18	10,000	Surendranagar.

Note: NA = Not Available.

and 1.87 lakh quintal of fodder was distributed by these agencies after procuring it from Punjab. The working capital for these operations was made available to these agencies in the form of interest-free loans by the State Government. Rs. 7.70 crore was sanctioned and advanced to these voluntary

agencies by the Collectors. Besides, the Collectors also advanced money through District Rural Development Agencies of their districts to the voluntary agencies.

3.2 These volunatary agencies were allowed to charge administrative charge at the rate of Rs. 5 per quintal for the fodder transported. This amount of administrative charge was included in the sale price of the fodder. The total amount of transport subsidy paid to these agencies during the drought of 1987 was Rs. 92 crore. As many as 639 cattle camps were opened by the voluntary agencies benefiting more than 5.10 lakh abandoned and handicapped cattle. Subsidy was paid at the rate of Rs. 4 per cattle per day.

Support by CAPART

4.1 CAPART was actively involved in mobilising and supporting voluntary agencies for participation in programme for drinking water, fodder cultivation, transportation and cattle camps in order to provide immediate relief as well as to formulate and take up long term projects for better water managtement, afforestation and water conservation for dought proofing. 59 projects for creating drinking water facilities in drought affected area at a cost of Rs. 1.93 crore was provided. CAPART also provided limited assistance for creating infrastructural facilities like cattle sheds and augmentation of water supply for cattle to the *pinjrapoles* and *gaushalas* of Gujarat and Rajasthan.

4.2 To provide support to drought affected cattle the GOI decided that FCI would reserve all the degraded wheat fit for utilisation as cattle feed and make it available to voluntary organisations engaged in catle camps. The degraded wheat was made available at a reduced price of Rs. 65 per quintal. FCI allocated about 7,000 tonne of wheat to voluntary organisations. Similarly, organisations engaged in manufacture of cattle feed were allocated molasses. At the instance of CAPART a number of voluntary organisations in Maharashtra produced fodder for supply to voluntary organsisations for cattle camps in Gujarat and Rajasthan. About 37,000 tonne of *jowar* fodder was supplied by the voluntary organisations to Gujarat and Rajasthan. CAPART assisted the efforts of the voluntary sector by providing interest-free loans.

Lessons Learnt

5.1 The voluntary action can povide important support to government programmes to face drought if properly coordinated and managed. On the basis of experience of the voluntary organisations in drought management following lessons can be learnt.

5.2 Drought relief and management should be a joint effort mainly of small groups/organisations working in the drought affected States. State level committees were set up in most of the States to coordinate the work of the voluntary agencies. Gujarat Government set up a coordination committee of voluntary agencies headed by Revenue Minister to specifically coordinate the various relief activities of voluntary agencies to combat drought. A non-official of high standing was appointed as the Chairman of the Committee. A separate post of Director, Voluntary Agencies was created exclusively to ensure that the efforts of the voluntary agencies were coordinated and made use of in area where drought relief was needed most. It was observed that the presence of Director as a coordinating officer was very useful in management of voluntary efforts in Gujarat.

5.3 Long term development efforts should be of such nature that these build the capacity to successfully cope with drought. The development programmes should be organised on area or water shed basis. Proper planning should be done based on socio-economic and technical survey of the area. Training of the voluntary workers should be an integral part of the implemantation of the action programme. All efforts should be made to organise the beneficiaries into groups to monitor implementation of the programmes. There should be no duplication of efforts between the government and the voluntary agencies The efforts should be coordinated and based on the understanding and the appreciation of each other's roles.

5.4 The benefit of the programmes (relief as well as development work) should reach the poor. Efforts should be made to ensure that the creation of assets should, as far as possible, help the most vulnerable sections of the society. There should be a close monitoring, evaluation and follow-up of the programmes. Committees with representatives of drought affected people should be set up wherever programmes are initiated and the responsibility of the monitoring should be assigned to such committees.

16 MEDIA SUPPORT

In the wake of drought of 1987, all the media units of the Ministry of Information and Broadcasting (MIB) mounted information campaigns in different parts of the country with the strategy of achieving the following communication goals: (a) to create an awareness among the masses about the seriousness of the drought situation; (b) to publicise the various relief measures undertaken by the Central agencies, State agencies and voluntary organisations; (c) to sustain the morale of the people and strengthen their fortitude to face and overcome the natural calamity; (d) to hold the price line and discourage hoarding; and (e) to increase production of *rabi* and summer crops.

Radio

All the stations of All India Radio (AIR) broadcast a large number of programmes in close consultation with concerned State Government departments. The total number of programmes put out by AIR from July 1987 to mid-August 1988 was 10,692 in a variety of formats. The thrust in the intial publicity drive was to ensure that the people were made aware of the various steps undertaken by Government and programmes sanctioned, to ensure full public participation in the Government programmes to prevent the ill effects of drought on socio-economic conditions and to ensure that there was no unnecessary panic reaction resulting in hoarding, price rise, etc. AIR stations mounted special programmes with close frequency in coopertion with the State Governments on creating awareness about the country's capability to supply and transport the essential commodities at very short notice to offset any shortage, about the need of poeple's participation and cooperation in implementing the crash schemes of Government to streamline the distribution system of essential commodities, on the need for retention of confidence in meeting the challenge of drought and avoid panic and loss of confidence.

2.2 Simultaneously the special audience programmes for rural women, industrial workers, youth, etc. were reorganised by the stations to inform on the following in relation to the drought situation: (1) selection of crops and seeds, fodder, vegetables and fruits for cultivation in drought-prone areas; (2) supply of essential commodities like edible oils, milk powder, pulses, sugar, diesel and kerosene; (3) anti-hoarding of essential commodities; (4) distribution system of essential commodities; (5) economic use of drinking water and urban water supply; (6) employment generation; and (7) public health including mother and child health.

2.3 In the second phase of the publicity drive, a comprehensive broadcast strategy was drawn on the basis of the reports and feedback obtained form the stations to meet the challenge of drought as well as flood lashing the major part of the country. Due consideration was given to the recommendations of the DAC. The broadcast strategy in the affected area aimed at the following directions.

1. For Rural/Farming Community

(a) Measures to save standing *kharif* crops;
(b) Selection of alternative short duration drought resistant crops;
(c) Protection of vegetables and fruits from the impact of drought/flood;
(d) Community action towards the supply and disribution of fodder;
(e) Growing of short-duration drought resistant fodder;
(f) Cultivation of pre-*rabi* pulses and oil-seeds as cash crops;
(g) Management of cattle including their health care in drought/flood affected area;
(h) Goat and sheep rearing in the situation of scarce availability of feed and water;
(i) Organisation and maintenance of cattle camps;
(j) Water management: drip irrigation, conservation and effective utilisation of irrigation water, and management of lift irrigation;
(k) Provision of irrigation water through implementation of various Government schemes;
(l) Government initiative towards supply of diesel and electricity; and
(m) Distribution and utilisation of credit and other agricultural inputs.

II. For General Audience

(a) Assuring sufficient stocks of the essential commodities;
(b) Supply of essential commodities through efficient and effective PDS;
(c) Government initiative towards distribution of milk, sugar, etc. through fair price shops;
(d) Provision of drinking water, Government's initiative in putting bore wells and supply through water tankers;
(e) Economic and austere use of water; and
(f) Public health: prevention of jaundice, malaria, bronchial and intestinal diseases; prevention of malnutrition; care of children and mother, and consumption of milk substitutes.

III. Price Line and Relief Measures

1. Price and Anti-Hoarding

(a) Steps by the Government to prevent hoarding;
(b) Government's initiative towards preventing price rise;
(c) People's participation in austerity measures;
(d) Prevention of panic in the society in drought/flood affected area;

2. Relief

(a) Arrangement and provison of drought/flood relief;
(b) Employment generation programmes of State Governments; and
(c) Credit distribution and management.

IV. Increase Production of Pre-*Rabi* and *Rabi* Crops

1. Pre-*Rabi* Crops

(a) Selection of short duration and cash crops for pre-*rabi* sowing;
(b) Selection of high-yielding varieties;
(c) Optimum plant population through proper seed rate;
(d) Use of quality seeds;
(e) Balanced fertilization for quick growth; and
(f) Need based plant protection.

2. *Rabi* Crops

(a) *Rabi* and summer crop planning relevant to drought/flood affected area;
(b) Selection of high-yielding varieties;
(c) Timely sowing with optimum seed rate;
(d) Application of irrigation to match the needs of critical stages of crop;
(e) Increased use of fertilizers;
(f) Substitution of high water consuming crops by the crops that need less water with particular reference to oilseeds and pulse crops;
(g) Provision of pre-sowing irrigation in case of crops grown under residual soil moisture;
(h) Advance sowing of *rabi-jowar;*
(i) Substitution of non-irrigated wheat by safflower and gram below the Vindhya belt;
(j) Completion of sowing of mustard by mid-November;
(k) Cultivation of sunflower as contingent crop in south India;
(l) Increased plant population of summer *mung* and summer groundnut;
(m) Cultivaton of low water-duty crops (oilseeds and pulses) in the tail-end area of the canals;
(n) Adoption of seed production techniques in the summer months under protective irrigation conditions; and
(o) Special practices for increasing overall yield of wheat, *rabi jowar,* pulses and oilseeds in the drought/flood affected area.

V. Communication Strategy for Increased Production of *Rabi* and Summer Crops.

(a) Programme schedules should be based on calender of farm operations prepared by the State Directorates of Agriculture;
(b) Programme schedules should be cleared by subject committees and rural programme advisory committees attached to AIR stations.
(c) Hold frequent meetings of rural programme advisory committees for evolving suitable programmes, time of broadcasts, frequency and mode of broadcasts;
(d) Regular announcements on the availability of agricultural inputs;
(e) Announcements regarding release of irrigation water from river valley projects;
(f) Frequent announcements about the schedule of electric supply;
(g) Broadcast of location-specific messages;
(h) Use of languages and dialects commonly understood and spoken in the listening zone;
(i) Avoid inconsistency in the messages through periodic evaluation of the programmes and their impact in monthly workshops and fortnightly training programmes attended by AIR personnel and personnel of field extension agencies of the State Governments;
(j) Broadcast success stories and outstanding achievements of the progressive farmers;
(k) Regular participation of Field Radio Officer in the review meetings convened by the State Agriculture Secretaries /Agriculture Production Commissioners;
(l) Inform non-farm population about the *rabi* crop production campaign to promote public confidence and to help maintain the price line;
(m) Initiate community action towards procurement and distribution of agricultural inputs; ensuring distribution of irrigation water amicably; preparing community seed beds; applying plant protection measures, and supervising operation of labourers.

2.4 AIR stations were asked to send to the Directorate General, All India Radio weekly reports on the programmes broadcast by them on drought and flood situations according to the communication strategy laid out and conveyed to the stations. Compiled weekly reports were sent to DAC as well as MIB.

Television

3.1 Television being a very effective media of information and mass communication, *Doordarshan* (DD) took up the challenge of facing the drought by evolving an appropriate communication strategy.

Table 55: Programmes telecast by Doordarshan Kendras, 1987-88.

S No	Name of *Doordarshan Kendra*	Number of Programmes in Various Formats	Number of News Items	Duration	
				Hours	Minutes
1.	Ahmedabad	35	—	6	28
2.	Bangalore	11	—	0	30
3.	Bombay	17	—	7	00
4.	Calcutta	12	—	2	26
5.	Cuttack	26	—	4	15
6.	Gauhati	11	6	2	05
7.	Gorakhpur	10	—	2	08
8.	Hyderabad	24	31	2	00
9.	Jaipur	90	—	15	50
10.	Jalandhar	13	—	2	37
11	Lucknow	68	—	7	04
12.	Mardras	28	—	5	00
13.	Nagpur	7	5	4	00
14	New Delhi	122	342	20	44
15.	Rajkot	164	—	19	32
16.	Ranchi	67	—	4	19
17.	Srinagar	14	—	3	11
18.	Trivandrum	27	10	4	28
	Total	746	394	113	37

The first and foremost effort of DD was to create an awareness among the masses about the seriousness of the drought situation by disseminating information. A large number of visuals on drought from the different parts of the affected areas were mounted in a sustained manner to give the viewers an actual feel of the situation . The aim was to create a sense of participation among the viewers for facing the situation boldly without getting scared.

3.2 Various relief measures to face the drought were undertaken by the Central and State governments. Private and voluntary organisations/agencies also came up in a big way. Their efforts were publicised by DD to create a sense of confidence among the people. All the 18 programme originating *kendras* of DD including New Delhi were geared to chalk out special programme plans to telecast suitable programmes to fight out the evil effects of the drought. DD *Kendra,* Delhi being the nerve centre of the organisation, revamped its programmes both on local and national channels to accommodate special talks. Prime Minister's call to involve development agencies in drought relief work was highlighted in news bulletins, besides his letter to all the State Chief Ministers. Relief measures, commendable work done by the social workers, and roles played by the individuals and voluntary organisations in this context were highlighted in the form of news stories, clippings, documentaries, etc. Delhi station itself telecast a large number of programmes in various formats right from August 1987 upto the middle of June, 1988. The details of the programmes telecast by DD in 1987-88 are shown in Table 55.

3.3 The Directorate General, DD provided guidelines to all the 18 programme originating *Kendras* to chalk out appropriate special programmes in the following area:

I. Cropping Pattern:

(a) Contingencies for alternate/new cropping pattern; and (b) Short duration varieties as substitutes.

II. Fodder for Cattle:

(a) Care of animals in the drought prone area; (b) Alternative sources of fodder, e.g. bamboo, molasses, etc.; and (c) Control of diseases among animals.

III. Water Management:

(a) Economy in water use; (b) Supply of drinking water; (c) Urban water supply; (d) Preventing water evaporation in tanks/reservoirs; and (e) Proper use of water resources for irrigation.

IV. Power and Diesel:

(a) Increased power supply to tube wells and pumping sets; (b) Proper maintenance of pumping sets to achieve maximum efficiency; and (c) Regular supply of diesel in the rural area for irrigation.

V. Efforts of various Government Agencies;

(a) Impart information on various Government schemes and relief measures undertaken; (b) Employment generation in drought affected area; and (c) Encourage relief work undertaken by voluntary agencies.

VI. Health:

(a) Measures undertaken to prevent diseases; (b) Nutrition for women and children; and (c) Control of diseases among children; (d) Pre-natal care.

VII. Essential Commodities and Distribution:

(a) Steps taken by Government to provide vegetables, fruits, edible oils, sugar and milk powder, etc.; and (b) Evils of hoarding.

VIII. Rural Advisory Committees:

Special meetings of the rural advisory committees were convened to revamp agricultural programmes. Heads of all *kendras* personally got in touch with the heads of nodal agencies.

3.4 The Delhi *kendra* of *Doordarshan* being the nerve centre revamped its programmes both on local and national channels to accommodate special talks. Prime Minister's call to involve development agencies in drought relief work was highlighted in news bulletins besides his letter to all the State Chief Ministers. Relief measures and commendable work done by individuals and voluntary organisations were highlighted in the form of news stories, clippings, documentaries, etc. News programmes regularly took up reporting on the drought situation and the steps taken to povide relief. Staff and stringer cameras were deployed in the affected area to do special reportage on the drought stories. The Delhi *kendra* telecast a large number of programmes in various formats from August 1987 to June 1988 as detailed under:

1. News stories/reportage on drought (342 programmes);
2. Talks, discussions, interviews, features and documentaries in **'Krishi Darshan''** on crop patterns, dry farming, water-management, cattle feeds, and procurement of fodder, etc. (80 programmes);
3. ***Sukha Rahat*** : A weekly programme on drought relief, generation of employment, maintenance of price-line, and bank-loans, etc. (22 programmes);
4. ***Nirman*** : Development activities such as tree plantation, forest conservation, control of pollution, and cleaning of Ganga, etc. (10 programmes);
5. ***Vikas Ki Ore*** : Basically envisaged to cover 20-Point Programme, it was oriented in the context of drought situation to include new irrigation methods, and development of waste lands, etc. (6 programmes); and
6. **Focus** : In this series attention was focussed on drought and problems relating to it. (4 programmes).

Press

4. The Press Information Bureau (PIB) arranged publicity for the drought relief measures and posted the press with the position of drought in different parts of the country. The Minister of State (Agriculture) briefed the press every week during the monsoon and post-monsoon months of 1987. Press briefings were also arranged by PIB for senior officers of the concerned Ministries. Based on reports/comments appearing in the regional press, senior officers were apprised of state of implementation of different relief programmes. Main area of attention was Central drought assistance to the States, steps to minimise agricultural loss, measures for maximising *Rabi* production through popularisation of dryland production technologies, Government's efforts to ensure drinking water in rural area, fodder procurement and supply in deficit area, close monitoring of the price situation, and curbing of hoarding and blackmarketing in essential items. The feature unit of PIB put out special articles on the subject.

Advertising and Visual Publicity

5. Prime Minister's speech entitled *"Sukhe ki Chunoti Ka Vishwas aur Dhridatha ke saath Mukabla"* was brought out in Hindi in October 1987 by the Directorate of Advertising and Visual Publicity (DAVP) as a pamphlet for wide distribution in the rural area. 30-second radio special in English and in Hindi on *Rahat Patra* was broadcast over primary channels of AIR. The total number of such broadcasts was 63 between 25th December 1987 to 25th February 1988. The DAVP also produced one 20-second video spot in English and in Hindi on *Rahat Patra* for telecast in the national network.

Films

6. The Films Division (FD) released two reelers (colour) on different parts of the country on 8th May, 1988. The FD also released one reeler (colour) on relief measures undertaken in Rajasthan on 26th June, 1988 and two reelers (colour) on drought conditions in different parts of the country on 26th June, 1988.

Song and Drama

7. The Song and Drama Division issued instructions to all the field officers of the Division as well as to all the registered private drama troupes to include the messages relating to measures on drought in their programmes which were conveyed in the form of dialogues, speeches and commentaries in between programme items through inter-personal communication with the members of the audience.

Field Publicity

8. All the 257 field publicity units of the Directorate of Field Publicity organised intensive programmes throughout the country at the grassroots level. In pursuance of the decisions taken at the regional conference on agriculture for *rabi* compaign in 1987-88 to meet the drought situation, instructions were issued to Regional as well as Field Offices to undertake necessary publicity among the farming community to maximise food production in *rabi* crops so as to compensate for the losses in the last *kharif* crop caused by the persistent drought. Functioning on the ground at the grass-roots level, the field publicity units were urged to sensitise and motivate the farming community in the country through exhortations in their direct contact progammes with them. The multi-faceted oral communication strategy targetted to the farmers within the frame-work of DAC's guidelines aimed at driving home to them the need for taking concrete/urgent steps to overcome the drought conditions affecting them. The methodology adopted by the field publicity units was:

(a)To maintain a constant touch with State agriculture departments and relief organisations, on the one hand, and the farmers, on the other;

(b)To involve all the voluntary and social welfare organisations in the information drive;

(c)To distribute all the available literature on the subject in local languages;

(d)To extensively screen suitable films like "Breakthrough in Agriculture", "Rainfed Farm Practices", and "Food", etc.,

(e)To issue "Talking Points" to all the field publicity officers on the measures to meet the challenge of drought; and

(f)To provide regular inter-face between farmers and State agricultural departments.

9. Regarding coverage of drought situation by foreign media agencies, Secretary, Department of Agriculture and Co-operation (DAC), acted as the focal point. He was required to provide brief on the precise magnitude of the drought and the relief measures carried out by the GOI and State Governments. Ministry of External Affairs was to have a close liaison with the Secretary, DAC in this regard. In the States, the Chief Secretaries were required to nominate a senior officer as nodal point who suitably briefed the foreign media agencies as and when contacted by them.

10. The MIB and its media units played a crucial and complementary role in combating the drought situation. The media units in collaboration with various Ministries of the GOI and State Governments acted in unison in facing the challenge. The content, reach and sweep of the programmes were suitably re-oriented to meet the requirements of rural people. The multi-media publicity campaign mounted by the MIB in a sustained manner sought to provide not only concrete information but also to instil a spirit of hope among the farming community in the country.

The drought of 1987 witnessed the development of a comprehensive approach and an integrated strategy for drought management in the country. From a somewhat passive response to preventing starvation, the country moved substantially towards building up a more positive set of initiatives. Drought as a creeping disaster was found to have been examplified in all its aspects by the conditions created by the failure of the south-west monsoon in 1987. The country emerged from this drought with minimal set back to its economic development. In no small measure, the optimistic environment at the beginning of monsoon in 1988 was due to the success of the disaster management strategies adopted by the GOI and the State Governments during one of the worst drought periods in recent history.

2. Over the years, since independence, relief administration has been recognised as the primary responsibility of the States and the role of the GOI has been one of supplementing the State efforts. Consequently, extreme diversities have been noticed in thequality of relief rendered in different States in the wake of natural calamities. The drought of 1987 was very wide in its sweep and 15 States and 6 Union Territories were significantly affected by the failure of the south-west monsoon. The drought came to be perceived as a national calamity. In line with the concept of welfare state, it was natural for the GOI to actively address itself to the alleviation of the distress in different States. From a national viewpoint, Statewise disparities in the type and extent of relief were not acceptable. A change in the approach of both of the GOI and the State Governments to administration of relief was, therefore. suggested by the situation. Consequently, the GOI decided to play a more positive role in helping the States to render timely and appropriate relief to the affected population. The formation of the

(a) CCD headed by the Prime Minister for laying down policies, guielines and identifying responses.

(b) COS for monitoring and implementation of drought relief programmes and ensuring coordination between the Central departments and agencies, and

(c) CMG in the nodal DAC for interacting with the State Governments and different implementing agencies to identify cmerging crisis and suggest appropriate measures.

gave a concrete shape to this new thinking and approach. The deliberations in these fora and the decisions flowing therefrom gave rise to a new concept of drought management in place of the hitherto dominant concern of drought relief.

Response

3.1 Disaster preparedness is a crucial step in a society's ability to not only meet the challenge of the disaster but also to emerge from the crisis with the least set-back to its socio-economic fabric. The strategy in such a situation calls for a set of short-term responses as well as long-term perspectives. The drought management of 1987 was accordingly characterised by early response and dynamic decision-making in relating to emerging situations. When the clouds of the south-west monsoon were

not to be sighted as late as July, 1987, it was realised that the country might have to face severe drought conditions in the days to come. The reconnaissance visits of the Area Officers of the DAC at this point of time also pointed to a possible extensive adverse impact on agriculture in the face of the delayed monsoon.

3.2 The CCD finalised an Action Plan in early August, 1987. This Action Plan envisaged a series of contingency measures to be taken by the State and the GOI agencies in relation to agriculture, irrigation, drinking water, health, power and essential commodities. Specific mandates were given to GOI agencies for a continued follow-up. The major concerns at that time were saving of agricultural crops, provision of drinking water, provision of fodder, availability of power and diesel, and utilisation of available irrigation water. The concept of a water budget for the reservoirs and other irrigation sources was advocated to take care of the needs of human beings, animals and crops over as long a period as necessary. A Contingency Agricultural Plan was recommended to the States for optimum utilisation of precipitation through shift in crops and appropriate agronomic operations. The priority accorded to the agricultural sector in the supply of power and diesel also helped in meeting the water requirements of crops during the crucial periods of growth.

Policy Initiatives.

4.1 The corner stone of a sound and effective drought management policy is to ensure dynamism in responding to the changing situation. This was very much in evidence in the GOI's stage-by-stage response to the drought of 1987. When the *kharif* crops in the drought affected States were initially affected, the GOI commenced the Contigency Agricultural Plan for implementation. In October, 1987 when it became evident that the effect of drought would persist over a longer period and provision of relief to affected population was to be properly and effectively planned and executed, employment generation became a major concern of the States and the GOI.

4.2 When relief measures for a longer period were recognised as inevitable, it was necessary to ensure that these did not suffer for want of resources at the operational level. A mandate from the Prime Minister laid down a strict time-frame for deciding the quantum of financial assistance to be provided to States. The earlier approach was to send out central teams on receipt of memoranda from States and decide on the quantum of Central assistance in a meeting of the HLCR on the basis of the central team's report. This implied that the process for carrying out drought relief operations would only commence in the months of November/December when the States would be submitting memoranda on the basis of detalied estimates of crop failure and formal declaration of scarcity/ drought.

4.3 In the drought of 1987, the GOI took early initiatives by way of evolving an action plan to minimise crop loss, plan for contingency crops, conserving water in storage reservoirs, providing ways and means assistance and strengthening of the PDS. The States responded to the GOI's keenness to ease resource constraint in the implementation of relief measures by early submission of memoranda in August/September, 1987. The GOI was very prompt in finalising its decisions on the quantum of assistance before the end of October, 1987. This step ensured the timely availability of much needed resources to the States to plan and execute relief measures in an effective way.

4.4 Due to the absence of precipitation in most parts of Gujarat and Rajasthan, the fodder situation became acute by September, 1987 itself. This called for innovative measures in ensuring that the cattle wealth of the States was not destroyed due to lack of fodder. The States were advised to open cattle camps, where the cattle of the weaker sections of society could be taken care of, to arrange for the movement of fodder to the needy area and to encourage migration of cattle to places, where they could be maintained during the drought period. The GOI also provided subsidies for the transportation of fodder. Substantial fodder was procured and transported to the States of Rajasthan and Gujarat. The GOI's involvement extended to coordinating the activities of procurement and movement of fodder by railway from States with surpluses like Punjab, Madhya Pradesh and Maharashtra. The GOI's emphasis on the involvement of voluntary agencies ensured their association with the maintenance of cattle camps to a significant extent in the States of Gujarat and Rajasthan. Subsidies for the maintenance of cattle in these camps were extended by the GOI.

4.5 The developing acute drinking water shortage in the month of August was addressed by the GOI in a resolute manner. Ways and Means advances to the State Governments for taking up works of provision of drinking water in the affected area was sanctioned in August itself. The GOI's

financial help extended to the augmentation of physical resources like rigs, geo-electrical and hydro-fracturing equipments. This went a long way in considerably improving water availability in the rural area. The water supply situation in the cities of Udaipur, Ajmer, Jodhpur and Jaipur, of Rajasthan and Rajkot and Jamnagar, of Gujarat was very acute and the situation called for substantial measures for augmentation. Special Central assistance was extended for this purpose to these cities for meeting the situation.

4.6 The developing severity of drought called for steps to ensure availability of food to vulnerable sections of society. This requirement was met effectively through a crash programme of strengthening of PDS, commissioning mobile fair price shops and uninterrupted movement and supply of foodgrains to the drought affected area. The problems of coordination between FCI, railway authorities and the States were monitored on a day-to-day basis. The adverse impact of limited food availability caused by erosion in income was relieved through distribution of foodgrains in lieu of a part of the wages. The diversity in the system of payment of grains as part of wages in the different States gave rise to a uniform policy throughout the country in respect of employment on relief works. The special needs of very severely affected population were taken particular care of in an attempt to enforce uniformity. In the SDAAs of Gujarat and Rajasthan, an enhanced quantum of foodgrains was permitted as part of wages.

4.7 In the efforts to maintain the price line, apart from regulatory measures, substantial reliance was placed on augmentation of availability of essential commodities through imports and regulated releases from the buffer stocks. The GOI took an unprecedented step in extending subsidies for cultivation of vegetables in the vicinity of metropolitan area and other urban area to make up for the loss of production of vegetables due to drought.

4.8 The compelling need for applying resources to their most productive use in times of scarcity permeated the thinking of the relief administration throughout the country. This awareness led to the allocation of financial resources to some innovative schemes and programmes. The fodder shortage in some area was relieved by providing financial assistance for cultivation of fodder crops by using the available moisture in these area. Special assistance was extended to the States for speeding ,up projects, which could be completed to provide water during the drought period. At the field level, non-conventional types of fodder were introduced. To tide over the crisis, Gujarat and Rajasthan resorted to feeding sugarcane to cattle.

Assessment

5.1 The impact assessment and assessment the logistics of administration of relief constitute two of the problem area in the provision of drought relief. Inappropriate methods in this regard may lead to widespread discontent, feeling of injustice and waste. The major determinant of effectiveness in relief is the ability of the administration to provide adequate and timely relief to the deserving and needy. It is, therefore, necessary to have a proper assessment of the level of deprivation and suffering and the extent of succour needed by different sections of the society. The changing socio-economic milieu of the society has a significant bearing on the perception of the needs of different area.

5.2 The GOI was faced frequently with the criticism that relief in some States was not reaching the area actually affected by the drought, while substantial relief measures were being taken up in area comparatively better placed. Complaints were also received that no or negligible relief was being given to extremely vulnerable sections and in certain chronically improverished area, mainly because the affected area was remote or the population was less articulate in projecting its hardships and needs. The GOI impressed upon the States in the meeting of Chief Ministers, addressed by the Prime Minister, and in official meetings about the need for evolving objective and realistic criteria for determining the quantum of assistance required for particular area and/or by particular section of the society. A major concern in the provision of relief was to ensure its adequacy in terms of employment generation and supplementary nutrition. This concern led to the GOI announcing special financial assistance to the States of Gujarat, Rajasthan and Orissa to ensure that the special needs of certain disadvantaged sections of the society were adequately taken care of.

5.3 The problem of assessment was very pronounced in the estimation of the employment needs of different area. Employment generation in a period of drought is the basic means of providing income and purchasing power to those sections of society whose normal means of subsistence have been impaired by drought conditions. Relief works are essentially meant for meeting this need. Therefore,

proper surveys about the profiles of population relying on activities which are likely to be disrupted by drought conditions, would have to be undertaken periodically and they should form the basis for the estimation of their employment generation needs.

5.4 The relief measures highlighted the shift in the pattern of dependence of different sections of rural population on farm income. Even in the case of small and marginal farmers, the dependence on farm income had gone down significantly over the years. Mere arithmetical approach to the estimation of employment generation having regard to the pattern of land-owning and landlessness, results in over-estimation. The estimates of State Governments over the years have consistently been belied by the number of people actually reporting for work, the proportion varying from area to area and State to State. The crucial factors, having an impact on the society's inclination to seek relief employment, relate to the state of economic development, preference for particular type of work, effectivencess of the society in finding its own avenue for supplementing incomes and the opportunities elsewhere. The estimates furnished by the State Governments have continued to ignore, by and large, these crucial factors. Consequently, the assessment of the central team formed the basis for ensuring an element of accuracy in the estimates for employment generation.

5.5 Employment on relief works and PDS of essential commodities provide succour to vulnerable section of drought affected population to meet its nutritional requirements. The sense of dignity preserved by these arrangements was perceived as a preferred alternative to free feeding programmes or gratuitous relief. Therefore, the usefulness of the employment generation works was a major concern of the GOI in the drought relief works.

5.6 States were frequently advised to take up relief works leading to the creation of durable assets, preferably contributing to the productivity of the society. Traditionally the States' projects for generation of employment have centred round intensifying earthwork related activities like NREP, RLEGP works, irrigation works, road works, digging of village tanks, etc. In the SDAAs, however, where such productive works could not be identified, the need for innovative forms of employment of the drought affected population had been continuously felt. While the economic development of such area may provide solution over a long term, the short-term planning must aim at generation of subsidiary skills in population, exposed to frequent droughts so that different avenues of employment, employing such skills, could provide an answer to the difficulty of ending earthwork related to employment works. In the event of extreme paucity of useful works, participation in nation building activities like adult education programme, social awareness programme etc. may also be mooted as basis for placing purchasing power in the hands of the weaker sections. Relief administration cannot be a static reactive concept but has to be dynamic with reference to the development of society and continously re-oriented. These aspects require careful consideration.

5.7 An issue, which agitates the concerned sections of the society in time of drought, is the level of wages realised by them on relief works. There have been cases wherein it was reported that the wages paid to workers on relief works were low. The employers have reservations on paying full wages prevalent in the area on the ground that the wages are essentially in the nature of relief and not full compensation for the output. The workers on relief works, on the other hand, claim full compensation on the ground that irrespective of the fact that the work was in the nature of relief, they should be paid full wages prevalent in the area for the work done. The relief employment requires labour from a person rendered weak by falling nutritional levels in times of drought. The wages cannot be dissociated from output lest relief employment degenerates into gratuitous relief. Therefore wage for relief work has been treated as class by itself.

Logistics

6.1 The problem of logistics impeded the performance of some States in the organisation of relief works, in maintaining nutritional levels of some area and management of PDS. In the case of some States these deficiencies were very pronounced. Many States could make adjustments in the administrative set up and procedures to meet the special needs of drought relief administration. The response to emerging situation and the averting of major crisis directly varied in proportion to the ability of the State administration of different programmes. The GOI departments could gear up appropriate logistic support to the implementation of the Action Plan including those items which were complementary to the States' own efforts. The need for proper planning of the logistics of executing an effective plan for relief measure was noticed in the case of some States. The execution of employment generation works, the speed of completion of drinking water programmes and

effectiveness of special nutrition programmes could have been substantially better in these States, if only the kinetics of implementation had received greater attention.

6.2 A closer monitoring of the implementation of relief programmes in the States was an important ingredient in the drought management strategy of the GOI. The DAC kept very close liaison with the States and interacted at appropriate levels for information on the progress of implementation of relief measures. The reports monitored by the DAC concerned employment generation, nutrition and animal care activities and the expenditure on items, for which specific central assistance was extended. Initially, except for some States like Gujarat and Rajasthan, reports from States were not very-regular. However, by the time the relief measures in the States picked up momentum, most of the States geared up their machinery to furnish information to the DAC and interacted continually on specific issues without any appreciable loss of time. In promptness and accuracy of information relating to relief measures Gujarat excelled; the management information system introduced by the State for monitoring relief measures could provide an answer to the difficulty experienced by other States in ensuring a regular flow of up to date information to the State and National headquarters.

6.3 The importance of non-official input in the monitoring of relief operations cannot be minimised in a democratic set up as is obtaining in India. The public satisfaction with relief measures depends, to a large extent, on its perception about the responsiveness of the administration in relation to the quantum and quality of relief measures. The bodies of public representatives functioning at various levels as a result of democratic decentralisation in the country project and articulate the needs of a society to the implementing agencies. The GOI laid great emphasis on the proper functioning of relief coordination committees consisting of public representative at the State, district and sub-district levels. These innovative steps helped the GOI in getting apprised of the difficulties faced by different sections in different parts of the country.

Funding

7.1 The year 1987-88 witnessed a watershed in the quantum of central assistance for drought relief. The ceilings of expenditure approved in 1987-88 was Rs. 1472.10 crore for drought relief. This was more than the total assistance for the preceding two years of the Seventh Five Year Plan (1985-90). The increasing expenditure on drought relief programmes has brought into sharp focus the need for greater vigilance in the choice of works under the programmes. Nearly 57 per cent of the central assistance went to employment generation works. Absence of proper planning and dovetailing with well formulated perspective plans in some States led to the undertaking of non-productive works to some extent. The choice of works in many cases were found to be *ad hoc* and mainly designed to meet the need for employment generation without any consideration of its contribution to the drought proofing of the area or the productivity of the society.

7.2 A large number of works in some States were found to have been left incomplete only to be taken up at the time of subsequent scarcity mainly with the purpose of generating employment. In a few States, the percentage of works left incomplete at the end of relief was noticed to be as high as 50 per cent. A solution to this problem can be found only by a detailed investigation and assessment of the potentialities in particular area and formulating a shelf of projects, and micro level plans for ensuring that only works, which are perceived to be needed by the society are taken up. The Governments of Gujarat and Rajasthan were advised to work out micro level plans in respect of SDAAs of these States on a pilot basis. The result of this exercise will provide a pointer to the type of solution in respect of SDAAs of the country.

7.3 In evolving a long-term perspective, specially in relation to mitigating the impact of drought in SDAAs, the following policy issues need to be looked into:

(a) Restricting growth of population in SDAAs;

(b) Encouraging migration from SDAAs through incentives of allotment of land, etc.; and

(c) Maximising labour content in on-going development schemes.

7.4 In the light of the substantial investment in drought relief programmes, the States would have to envisage a proper long term strategy for making this investment re-inforce the economic development of the vulnerable area and making them more resilient to the adverse climatic conditions. The measures would involve a detailed inventory of physical resources and exploitation of avenues for employing the population in the area in making productive use of these resources through

formation of appropriate skills. These objectives can be served only if the flow of financial resources can be linked more closely with the States' own plans and commitment for the improvement of the vulnerable area. The GOI announced additional Central assistance for speeding up completion of selected irrigation projects in the drought affected area in some States mainly with a view to give recognition to such commitments to a long-term strategy for building up resilience to drought conditions. It has been felt that current scheme of flow of Central assistance is not designed to promoting greater awareness and commitment on the part of the States to sound disaster preparedness. Therefore, inspite of a record flow of Central assistance in 1987-88, some States felt that resources were inadequate for meeting the challenge of drought. The experience of the drought of 1987 should, therefore, act as a catalyst for the development of a sound national policy and perspective and the best strategy for ensuring resources for drought preparedness and relief management to be adopted by the country.

Agricultural Production

8.1 The most significant aspect of the management of the drought of 1987 has been the food security and the significant success in minimising the adverse impact of drought on the agricultural production. The substantial food stocks of the GOI were utilised for controlling the price line through regular releases through the PDS and supplementing the real income of the vulnerable sections through distribution of foodgrains as part of wages. This food security was built over a period of years because of substantial surpluses in wheat production. It was, therefore, of paramount importance to ensure that the drought conditions in 1987 did not cause very sharp fall in the agricultural production. The Contingency Agricultural Plan was very actively pursued and closely monitored through a system of visits by Area Officers in the DAC.

8.2 A close watch was kept on the need and the availability of seeds of different crops in different area. The availability of fertilisers, diesel, and power was closely monitored. All efforts were made to use the moisture available in the different parts of the country to the fullest extent. The providential rains towards the close of south-west monsoon followed by a good north-east monsoon, were fully utilised to motivate farmers to take up the most appropriate crops for cultivation in different parts of the country and maximise agricultural production in *rabi* 1987-88. These measures helped in restricting the fall in agriculture production to about 3.5 per cent from the production level of 143.41 million tonne achieved in 1986-87 despite the poor winter rains of 1987-88. The agricultural production strategy during drought of 1987 has demonstrated that proper management of the economic and physical resources can ensure food security in the country.

Relief Administration

9.1 As a part of the on-going efforts to obtain a regular feed back on the nature and quality of the relief programmes, the National Advisory Council on 20-Point Programme Implementation gave priority attention to those points in the 20-Point Programme which had a bearing on the drought affecting many States. The field visits were undertaken by a team consisting of Prof. C.H. Hanumantha Rao, Shri Sanjeet Roy and Shri R.K. Mahajan to Gujarat and Rajasthan during October,1987. The recommendations based on the impressions, gathered by the team in the course of the field visits and on intensive discussions in the Council were presented by the team to the GOI. These were considered by the GOI and conveyed to the States for follow up action as well. A summary of the recommendations of the Advisory Council may be seen in Annexure-XXX.

9.2 Throughout the drought period the GOI followed an open policy in relation to dissemination of information relating to drought and relief measures.The people were kept in the picture through National, State and field level advisory committees and programmes on the television, radio and press. The public response to such information dissemination immensely helped in identifying the deficiencies in the implementation of the relief programmes and the needs of vulnerable area in the country. Besides the corrective measures to redress the sufferings of the affected population, new policy initiatives were also taken in response to public views and aspirations. It was only on account of the grit and fortitude of the Indian people and a responsive administration that the country could very successfully face one of the worst droughts of the century with least privation and minimum ill effect on the economy. In the process India has gained very valuable experience which enhances its capability to face a crippling natural disaster like drought with greater resilience and confidence in future.