

**INPUTS TO UNICEF STRATEGY FOR DROUGHT  
MITIGATION IN ANDHRA PRADESH**

Prepared For

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## BACKGROUND

### Andhra Pradesh – A Brief Profile

Andhra Pradesh is the fifth largest state in India with an area of about 275,000 sq km and the fourth most populous state. A third of the population of 66.5 million (1991 Census) live in areas that are drought prone. A majority of the population in the state lives in rural areas (73 percent) where agriculture continues to be the predominant source of employment and livelihoods. Eight of the twenty three districts in the state are identified as drought prone and are covered under the DPAP programme of the government of India.

The state can be divided into three regions - Coastal Andhra, Rayalaseema and Telengana on the basis of location, history and socio-cultural moorings. The tribal dominated hilly areas which spread across the Telengana and Coastal Andhra regions can be considered a fourth zone as they are particularly under-developed and have a unique set of problems. With two major river systems passing through the state and draining into the Bay of Bengal, the state has areas rich in water resources as well as semi-arid regions which are largely rainfed. Droughts and scarcity of water in summer months are a recurrent phenomenon in these semi arid zones that cover over two third of the land area in the state.

Agriculture continues to be an important contributor to the state economy although the changing structure of the state economy is reflected by the fact that between 1960-61 and 1995-96, the share of agriculture declined from 59 percent to 38 percent while the tertiary sector increased its share from 29 percent to 43 percent<sup>1</sup>. During the nineties, there has been a significant decrease in the share of agriculture in the NSDP while construction and transport sectors have shown an increased share. The state investment in irrigation has been spread thin over multiple projects resulting in non-completion and cost over-runs. About two-third of the gross cropped area does not have an assured source of irrigation and agriculture is constrained by low productivity, lack of assured supply of inputs, lack of technologies and cropping systems suited for dryland conditions, degraded resources and poor extension. Despite this, agriculture provides a livelihood to over 70 percent of the population. Landlessness is high in the state and 10 percent of the farming households operate 44 percent of the land. The landless, marginal and small farmer households belong mostly to backward or disadvantaged groups and land reforms have not made any significant impact on the poor.

The work force participation rate in the state is high at 45 percent, among the highest in the country (All India WPR is 38 percent) but the per capita income is lower than the national average (AP: Rs 8,938, All India: Rs. 10,771, in 1996-97 (Quick Estimates), at current prices) across all years over the last decade. The rural female work force participation rate in the state is high (36 percent in 1991) and is increasing but literacy levels among rural women are poor and the male-female literacy differential is as high as 27 percentage points in the Rayalaseema region of the state. The wage rate for women on an average is 30 to 40 percent lower than for men, across the state. These factors indicate that while the burden of work on women is increasing, they are largely in the low paid sectors and their capacity to take up more value added work with a lower component of drudgery, is not being enhanced.

Agriculture is expected to be at the center-stage of the policy for economic development in the state with the "Vision 2020" identifying Agro-processing, Dairying, and dry land farming

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<sup>1</sup> *Andhra Pradesh at 50 – A Data Based Analysis*, Data News Features

thrust areas for the all round development of the state. Thus, despite efforts towards diversification of the economic base, the state economy and livelihood of the rural population are closely linked to agriculture that in turn is reliant on rainfall in large parts of the state. Under such conditions, meteorological and hydrological droughts, which are slow on-set disasters, can have widespread and long-term impacts.

### **Human Development Indicators**

The state ranks low on human development indicators. There are significant differences across regions, socio-economic groups, gender and rural and urban areas. The sex ratio in the state as a whole has been declining steadily (following trends at the national level) from 986 in 1951 to 972 in 1991. Although the state average is better than the national average of 927, it is the lowest among the four southern states. The IMR is marginally lower than the national average (77 as opposed to 81 in 1991) but again is the highest among the four southern states. The NFHS-2 reports declining IMR figures over the 1984-1999 period. However, it also raised concerns of the child survival rates in the state<sup>2</sup> and called for intensification of child survival programmes.

In a comparison between rural and urban areas, NFHS-2 reported neonatal mortality to be 25 percent higher, post-neonatal mortality to be twice as high, infant mortality to be 45 percent higher and child mortality to be 67 percent higher in rural areas of the state, pointing to the large differentials within the state. Across social and economic groups, NFHS-2 reported higher infant mortality amongst the Scheduled Caste and Scheduled Tribe households. All indicators of infant and child mortality were noticed to decline with increase in "standard of living" and (except for neonatal mortality) with the increasing education level of the mother.

The State Registry System (SRS, 1999) reports a higher Crude Death Rate for males than female mortality across all age groups, the National Family Health Survey -2 (NFHS-2, 1999) has reported higher mortality figures for females during the early childhood (age 0-4 years) and the reproductive years (age 15 - 49). The findings of NFHS-2 indicate that excess female mortality occurs mainly after the first year of life and is thought to reflect the relative nutritional and medical neglect of the girl-child.

The state is characterised by a high level of regional heterogeneity in terms of Total Fertility Rate (TFR), but has managed a rapid decline in TFR during the 1980s and 1990s which is comparable to decline rates achieved by the states of Kerala and Tamil Nadu.

Communicable diseases constitute about 54 percent of the total burden of disease, non-communicable diseases about 34 percent and injuries 16 percent. Andhra Pradesh reports about 70,000 diarrhoea deaths (GoAP insert in print media, 1997) annually. The short-term morbidity prevalence rate is 132 per thousand population (NCAER, 1995), which is higher than the national average of 122. The prevalence rate for diarrhoea is 36 per thousand population, which is again higher than the national average and the highest amongst the southern states (NCAER, 1995). The private health sector is large in Andhra Pradesh with only 15 percent of the doctors employed in the government sector. While services provided by the government are the main source of preventive care, the private sector plays a more dominant role in diagnostic and curative services. The private sector accounts for over 80

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<sup>2</sup> 1 in every 15 children born during the 5 years preceding NFHS-2 died within the first year of life and 1 in every 12 children born during the same period died before reaching age five.

percent of health expenditures, almost all of which is out-of-pocket spending<sup>3</sup>. This high level of reliance on out-of-pocket sources places a disproportionate burden on the poor. Quality private health services are inaccessible to large sections of the rural population and do not cater to many of the diseases most common among the poorest and most vulnerable sections of society.

The findings of NFHS-2 indicate that the prevalence of Asthma, Tuberculosis and Malaria were significantly higher in the rural areas of the state. In the state as a whole, 25 percent of the children (age 12-35 months) reported receipt of at least one dose of Vitamin A, while only 14 percent received a dose during the last six months<sup>4</sup>. The analysis also indicated that children living in urban areas and children of literate mothers were more likely to receive supplementation, while Vitamin A supplementation was lowest amongst the Schedule Tribes.

The mean Body Mass Index (BMI) for women in the state is 20.3 as per NFHS-2. More than one-third (37 percent) of the women have a BMI below 18.5, indicating high prevalence of nutritional deficiency and these problems were reported higher in rural areas, amongst scheduled castes and tribes or other backward classes. Some degree of Iron-deficiency anaemia was reported in 50 percent of the women, with 33 percent being mildly anaemic, 15 percent moderately anaemic and 2 percent severely anaemic. The reportage was marginally higher in rural areas and slightly higher amongst women aged less than 25 years. Amongst the children, 72 percent have some level of anaemia, with 45 percent being moderately anaemic and 4 percent severely anaemic.

NHFS-2 reports 38 percent of children under three years of age as underweight and 39 percent of children stunted. 10 percent (according to weight-for-age) and 14 percent (according to height for age) of the children are reported as severely malnourished. Wasting is also evident affecting 9 percent of the children under three years of age. Malnourishment is also reported higher in rural areas and is reportedly linked to the educational attainment of the mother, nutritional status of the mother and to the household's standard of living.

The human development, health and nutrition situation in the state indicates that a significant proportion of the population has low nutritional and health attainment even in a normal year. Women, children and the elderly are relatively more vulnerable. The burden of diseases on communities is high and so is the household expenditure on health care, much of which is accessed from the private sector. In times of droughts, these conditions are aggravated and there is a greater stress on the vulnerable populations. The estimates of child, women and elderly population in the districts of the state is provided in Annexure A and is indicative of the relatively more vulnerable population in the event of a calamity like drought.

<sup>3</sup> The World Bank. *Andhra Pradesh - Agenda for Economic Reforms*

<sup>4</sup> NFHS-2, 1999

## Droughts in India and Andhra Pradesh

Nineteen percent of India's total area, with 12 percent of its population<sup>5</sup>, is considered drought-prone. The summer monsoon or the south-west seasonal rains (June to September), contribute 78 percent of India's annual rainfall. The extent of the country's agriculture and food production dependent on this climatic water resource can be gauged by the fact that rainfed farming areas account for about 70 percent of the arable land. The Indian monsoon rainfall behavior over different regions shows considerable spatial variability and conspicuous episodic variations that are determined by the air circulation patterns prevalent at that point in time. An analysis of 29 sub-divisional rainfall series<sup>6</sup> over the period of 1871 to 1990, clustering areas with similar rainfall characteristics and twelve other regional or global circulation parameters give rise to 5 homogenous macro-regions (Figure 1) with the following precipitation parameters (Table 1).

Region	No. of sub-divisions	Percentage Area of India	Mean JJAS* Rainfall (mm)	Percentage of Annual Amount	Standard Deviation (mm)	Co-efficient of Variability percentage
North-West	6	22%	490	90%	132	27%
West Central	8	33%	933	86%	126	14%
Central NE	5	20%	1002	83%	112	11%
North-East	4	9%	1419	69%	121	9%
Peninsular	6	16%	659	57%	98	15%

Note: \*JJAS - June - September  
 Source: Drought over Homogeneous Regions in India: 1871-1990, B. Parthasarathy et al. IITM, Pune.

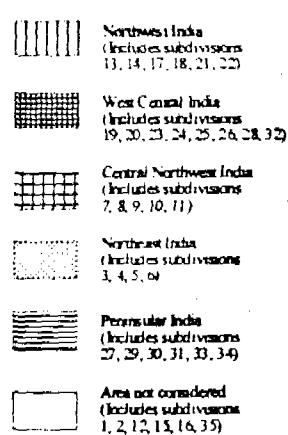


Figure (1): Homogeneous Regions of India

The data indicates that the North-west region receives the lowest mean rainfall (490 mm) a majority of which is concentrated over the June to September period. Peninsular India which covers 15 percent of the area, receives an average rainfall of 659 mm, 57 percent of which is concentrated over the June to September period. The coefficient of variability is high indicating that rain-fed agriculture is risk-prone in this area.

<sup>5</sup> India Disasters Report

<sup>6</sup> Parthasarathy et al. *Droughts over Homogenous Regions of India: 1871-1990*. Indian Institute of Tropical Meteorology, Pune, India, 1994

The number of drought years experienced in these five regions during the period of 1871 to 1990 is presented in Table (2). It indicates that there is increased frequency and relatively higher regularity of occurrence of droughts in the North-western and Central regions. Moreover, the phenomena of consecutive years of drought is observed most in the North-western region, while the peninsular region is least vulnerable to this risk.

Decade	All India	North-West	Central	Central NE	North-East	Peninsular
1871-80	1873	1877	1877	1873		1873
	1877			1877		1876
				1878		1880
1881-90					1884	1881
						1884
1891-1900	1899	1899	1899		1891	1891
					1892	1899
					1896	
					1900	
1901-10	1901	1901	1902	1901		1905
	1904	1904	1904	1905		
	1905	1905	1905	1907		
1911-20	1911	1911	1911	1918	1914	1911
	1918	1913	1913			1913
	1920	1918	1918			1918
			1920			
1921-30	1928	1925		1928	1925	1930
1931-40		1938		1932		1934
		1939				
1941-50	1941	1948	1941			1952
1951-60	1951	1951	1951	1951	1957	
				1954	1958	
				1959	1959	
1961-70	1965	1965	1965	1965	1961	
	1966	1968	1966	1966	1962	
	1968		1968	1968	1967	
1971-80	1972	1972	1972	1972	1972	1972
	1974	1974	1974	1974	1975	1976
	1979		1979	1979	1980	
1981-90	1982	1982	1982	1982	1981	1987
	1985	1985	1985		1982	1990
	1986	1986	1987		1986	
	1987	1987				
Total	22	21	20	19	20	18

Source: Parthasarathy et al. IITM, 1994

Meteorological droughts in Andhra Pradesh have historically impacted the Rayalseema and the Telangana districts more. The presence of surface irrigation sources in the coastal region and parts of Nizamabad (in Telengana) have prevented crops failures in the face of these

metereological conditions. Rainfall records from 1951 to 2000 indicate that that the state receives less than 750 mm rainfall once in every five years. Even in a seemingly good year, there can be significant spatial differences in the amount of precipitation received. While metereological monitoring is carried out at the mandal level (consisting of 20- 40 villages), aggregate analysis at district or the state level hides such spatial inequities of metereological factors.

Analysis of the annual rainfall trends of AP over the period of 1950-51 to 1995-96 period (presented in Figure 1), using cumulative departure from the mean annual rainfall provides an understanding of the dry and wet periods.

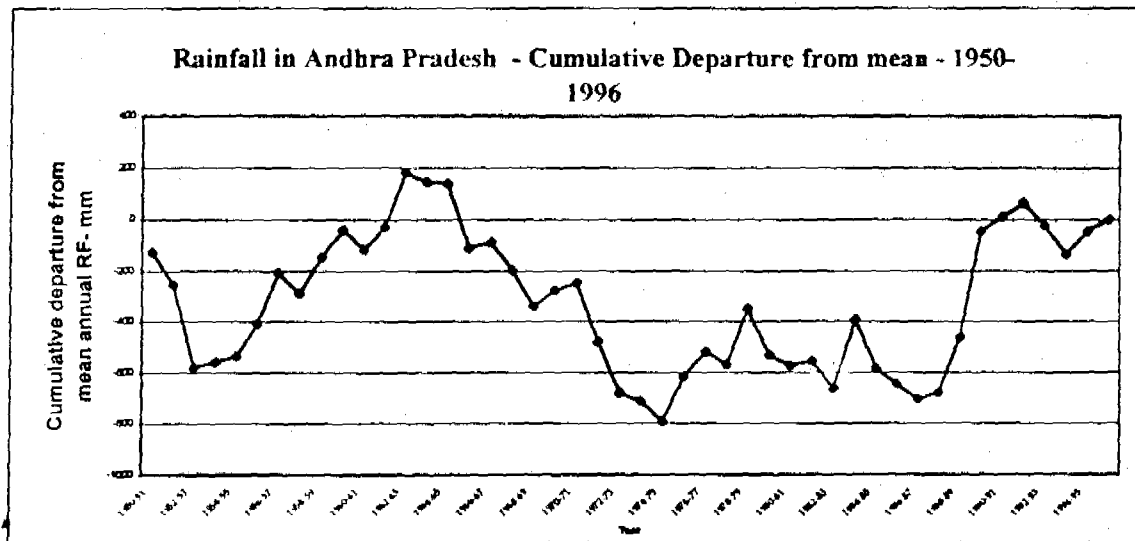


Figure 1: Cumulative Departure from the Mean Rainfall in Andhra Pradesh - 1950-1996

The wet periods are indicated by rising sections of the curve and dry periods are shown by the falling sections. This analysis indicates that dry periods of two to three consecutive years are common interspersed by wet periods of similar duration<sup>7</sup>. Therefore, ground water management strategies have to take into account at least two consecutive drought years. This would mean utilizing only a part of ground water storage and retaining sufficient groundwater storage for at least two consecutive dry years. In hard rock aquifers, the ground water storage is equivalent to 3 to 5 years rainfall (considering about 3-5% porosity and about 100 m thickness of aquifer zone). The groundwater in semi arid zones is a high stock and low flow resource,(natural stock: flow range of 30:1 to about 50:1) therefore it has to be carefully managed in order to mitigate impacts of droughts effectively. Also, the high stock situation in the initial stages leads to a false sense of security and does not make the renewability question obvious to the users. Ground water, which is the resource that should be maintained as the buffer for the drought years is not managed thus, in a regime or region where livelihoods have become primarily dependent on groundwater. Unfortunately, there is

<sup>7</sup> It has to be noted here that this analysis is constrained by non- availability of station-wise data over the same period, which may indicate more trends relevant for managing water resources in different parts of the state. It is likely that low rainfall regions of Rayalaseema may have longer dry periods than the Coastal and northern Telengana regions.



neither *effective*<sup>8</sup> groundwater legislation nor any local management mechanisms to control groundwater use in the state.

The above section has discussed the occurrence of droughts at the national and state level and effect of climatic considerations on these. The variability of this phenomenon spatially, indicates that the impacts would differ in terms of intensity within the state and even within the districts. Identification of vulnerable areas would need an integrated analysis of water resource data – surface and ground - agriculture practices, cropping pattern and also socio-economic grouping of the population based on their dependence on various livelihoods. This secondary data mosaic will need to be super-imposed with early warning data (on meteorological anomalies, crop area) to identify and prioritise areas for mitigation measures, for monitoring the progress of the event and planning relief activities.

### **National and State Policy on Disaster Management**

Traditionally, relief in the wake of natural calamities including slow onset phenomenon like droughts, has been treated as the primary responsibility of the States and successive Finance Commissions have reiterated this position. The Central Government associates itself with measures aimed at ameliorating the sufferings of the people through the use of its physical and financial resources. The dimensions of the response at the level of National Government are determined in accordance with the existing policy of financing relief expenditure and keeping in view factors like (i) the gravity of a natural calamity, (ii) the scale of the relief operation necessary, and (iii) the requirements of Central assistance for augmenting financial resources at the disposal of the State Government.

A note on the existing national and state policies for Disaster management is provided in Annexure C.

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<sup>8</sup> Emphasis on "effective" as the Groundwater Regulation exists for protecting drinking water sources, which is applied or resorted to only in times of scarcity/emergency.

## THE DROUGHT OF 1999-2000

The drought of 1999-2000 was one of the most severe droughts experienced in Andhra Pradesh in the last decade. Low rainfall during the south-west and north-east monsoons of 1999, amplified by ground water depletion led to a situation of successive crop failures imposing burden on the farming community, especially the small and medium farmers. The summer of 2000 witnessed drinking water shortages in many districts, with the drying up of water sources, falling groundwater levels and additional risk of contamination of available surface water sources. Groundwater data up to May 2000 showed significant fall in groundwater levels in the affected districts, resulting from low rainfall and extraction for agriculture. The average rainfall received during the year was only 534 mm compared to 763 mm in the preceding year. The fall in groundwater levels was high in Rangareddi, Nalgonda, Mahbubnagar, Cuddapah, Chittoor, Medak, Kurnool, Prakasam, Nellore and Anantapur. Of these, the districts of Anantapur, Cuddapah, Chittoor, Nellore and Prakasam bore the brunt of the drought, resulting in significant shortage of drinking water during the summer of 2000.

The critical effects of the drought condition were felt on agriculture and drinking water. The groundnut crop, that forms a substantial component of the annual earnings for the Rayalseema farmers was severely affected. Dry spells during the southwest monsoon affected kharif agriculture in twenty-two districts, with greater severity in the five districts mentioned above. Also, depletion of groundwater placed at risk groundwater dependent crops in the Rabi and Summer seasons.

During the summer of 2000, drinking water shortages were reported in about 50 percent of the Municipal areas in the state with the local administration having to resort to tanker supplies. In rural areas, water scarcity resulted from drying up of traditional surface and ground water sources.

### Initiatives by the State Government

The adverse seasonal conditions during Kharif, 1999 resulted in low cropping area and low production of the major rainfed crops during Kharif and the state government estimated the loss to be Rs. 5,669 million by the end of the season. The GoAP had submitted a memorandum to the GoI at this juncture seeking central assistance of Rs. 7,200 million from the NFCR. After observing the erraticity of the Southwest monsoon, the GoAP released Rs. 50 million for the contingency action plans for agriculture in the districts of Prakasam, Chittoor, Cuddapah, Kurnool, Anantapur and Mahbubnagar. This was utilised largely for supply of the 50 percent subsidy to cover unsown areas in Kharif. An additional Rs. 100 million was released during the Rabi season towards supply of seed at 50% subsidy to encourage Irrigated Dry crops, in view of the deficient rainfall conditions. District administrations were directed to enumerate the farmers who had lost more than half their crop, were not covered by crop insurance and did not derive benefit from the input subsidy in Kharif and Rabi. The identified farmers were to be assisted through input subsidies in Kharif 2000. After the enumeration, GoAP released Rs. 1,555 million towards the provision of input subsidies in Kharif 2000.

The state government set up a cabinet sub-committee in January 2000 to monitor and review the drought situation. The government declared 688 mandals in 18 districts as drought-affected in April 2000. All the districts in the Rayalseema and Southern Telengana regions (7 districts) and the coastal districts outside the Godavari and Krishna basins, were reported as

severely affected. Funds were released in April 2000 for the augmentation of drinking water supply sources and emergency supply of drinking water. The Neeru-Meeru programme in June 2000 provided a 90-day action plan for creation of water harvesting structures as a measure to buffer the onset of future droughts. This programme was carried out with the express intention of building the structures before the end of the monsoons and not for employment generation while funds were channelised through the DPAP and EAS programmes for employment generation in the districts. In areas that were not covered under the watershed programme, the Panchayati Raj department took up public works like road construction to provide employment. However, in most places, works for providing local employment were taken up only by late May (after the Janmabhoomi programme). This did not contribute significantly to mitigating the situation of household as they were facing the brunt of the drought condition since late 1999, when the food stocks of several households reached zero levels.

While the input seed subsidy announced at the end of Kharif, 1999 is reported as distributed at the start of the Rabi season in 1999, input subsidy disbursements in the study districts actually took place in early 2000 or May 2000. This resulted from the time taken to finish estimation procedures, reconcile differences between multiple data sources (Anantapur is a case in point) and also because of the financial constraints of the state government which did not receive any additional assistance from the GoI till March 31, 2000 (Source: Rajya Sabha debates). The financial allocations for augmentation of drinking water supplies and emergency supplies were made after the cabinet sub-committee decision and physical work was initiated during April to June, 2000. The provision of extra rice announced by the GoI and the state government initiatives to supply rice to the elderly were effected during the period of April to June, 2000.

The GoAP approached UNICEF during the summer of 2000 to provide support to the government for drinking water supply and health programmes, as part of the state government's efforts at drought relief. UNICEF provided assistance in the form of supply of VLOM Hand pumps, medicines and nutrition supplements.

## **THE SITUATION IN 2000-2001**

### **The Monsoon of 2000**

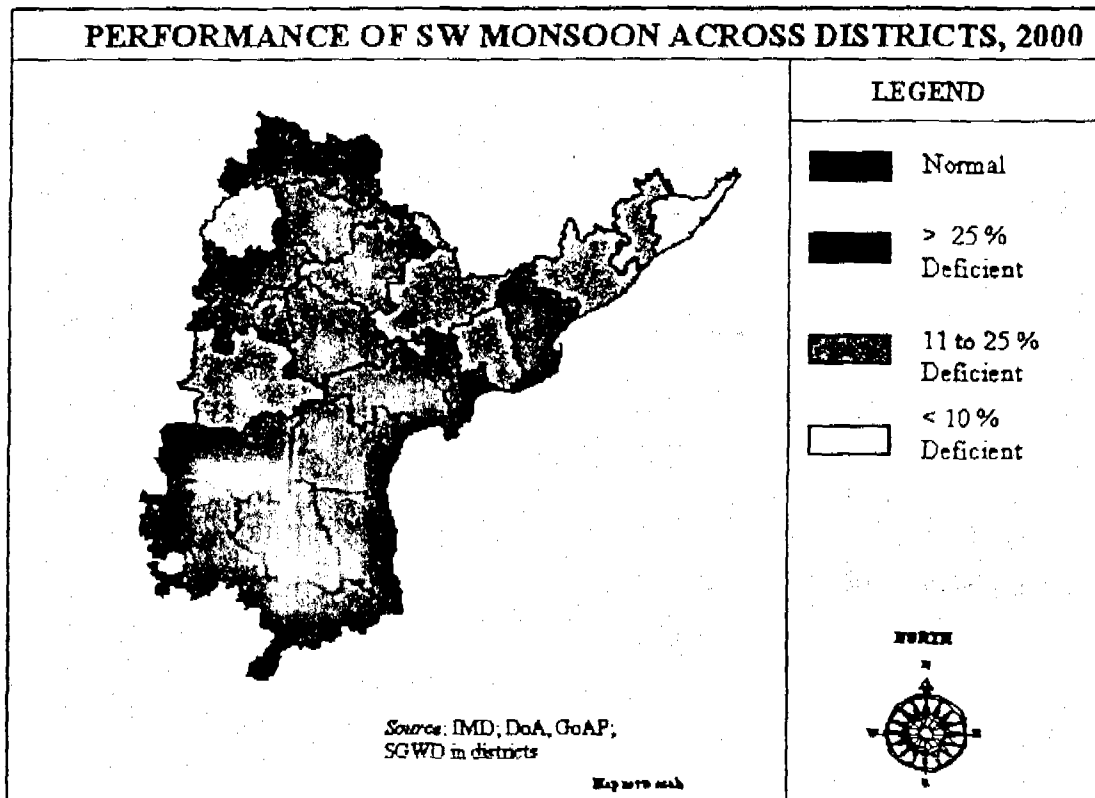
Most of the districts reported normal onset of the southwest monsoon and received normal rainfall during the start of the agricultural season. However, a gap in rainfall (or dry spells) was reported immediately after (during the seventh to eighth week) in the Rayalseema, southern Telengana and southern coastal districts. This was followed by a fortnight of normal rainfall and a fortnight where rainfall exceeded averages in the northern coastal and Telengana districts. This affected agriculture and normal life in the districts.

Thirteen districts in the state (See Table in Annexure C) including Hyderabad city suffered from major floods during the last week of August 2000. Large scale flood relief activities necessitated considerable efforts by the government machinery. The normal annual budget of Calamity Relief Fund of Rs.1,430 million did not prove adequate to take care of the drought relief operations in the state, especially when a need for flood relief also arose within the same financial year. Currently, the State Government has completely exhausted the Calamity

Relief Fund Budget allocation for FY 2000-2001 and will have a negative balance, which will need to be redressed in FY 2001-2002.

A few districts of Rayalseema – Anantapur, Chittoor and Mahbubnagar - have received deficient rainfall during the south-west monsoon of 2000. While the deficiency is not high, the pattern of rainfall has been erratic with dry spells after the sowing period and heavy rain during certain weeks. The Telengana districts have reported partial loss to the Kharif crops because of excess rains in August, 2000. In the background of crop losses during 1999, the second successive year of crop failures impacted farmers in these areas, even though selectively. Even with such concentrated rainfall and flooding, it is to be noted that the Srisailem and the Nagarjunasagar have not filled to capacity and provisions for power and irrigation during the end of the rabi season are already under threat.

The Rayalseema districts – Anantapur, Chittoor, Kurnool, Cuddapah and Mahbubnagar are likely to be more affected by this than other districts in the state.



### Agriculture

While the Telengana districts and the coastal districts have suffered partial crop losses during the kharif of 2000, farmers in the drier districts have reported lower yields from Kharif, 2000. The situation has to be viewed in light of a preceding round of failure in agriculture in the Rayalseema and south coastal districts, with the small and marginal farmers more stressed than the others.

The non-procurement of paddy by government agencies has affected the returns to farmers from Kharif. The impacts of this are felt more in the coastal districts and will have its indirect impacts later on employment. Also, the fall in edible oil prices after September will have its

negative impact on groundnut growers in the Rayalseema districts. The decrease in incomes after a year of crop failures is expected to prolong the recovery periods of farmers in these agricultural regimes.

In Mahbubnagar and Anantapur, the groundnut crop suffered a viral pest attack which resulted in crop losses. This has forced an increase in input costs due to greater use of pesticide, to protect the crop. In the light of a fall in market prices, economic returns to the groundnut farmers will be adversely impacted. The restrictions being proposed on power supply in rural areas during the rabi season are likely to impact the out-turn of rabi crops, adversely.

### Development of Irrigation – How have we fared?

The state has spent about Rs. 66, 600 million on development of irrigation during the 1951-97 period<sup>1</sup>. These investments have created a total irrigation potential of 2,271 mha, of which 0.553 mha was created through minor irrigation structures and the rest through major and medium irrigation projects.

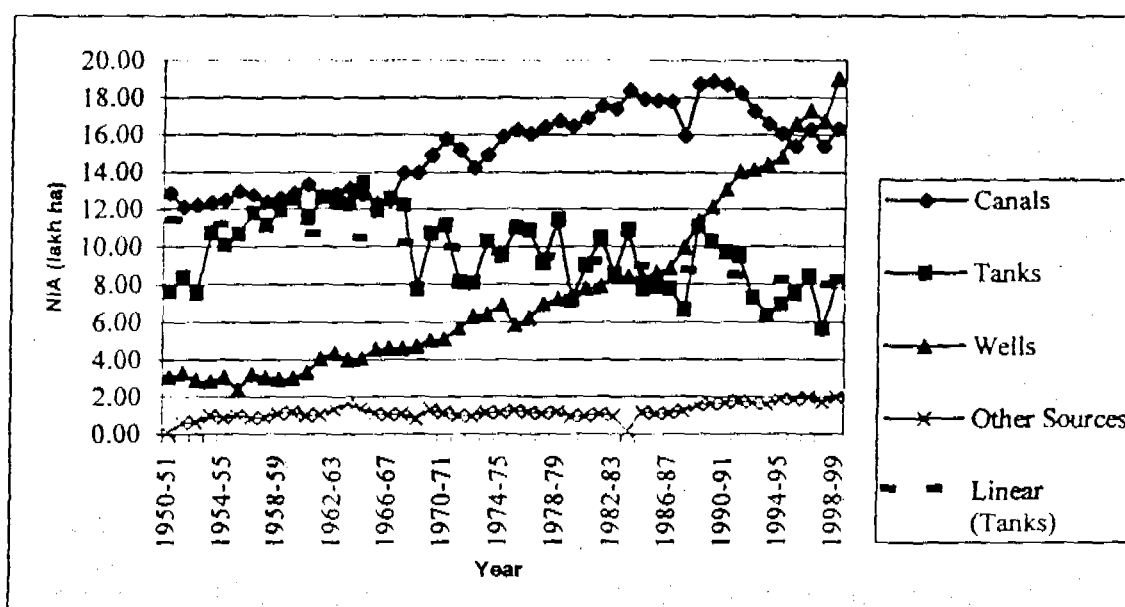


Figure 1 : Growth in Net Irrigated Area (mha) by Different Sources (1951-1999)

However, it is to be noted that the actual Net Irrigated Area (NIA) by canal irrigation (major and medium) increased by only 0.352 mha during the same period. Considering an irrigation intensity of 140 percent for canals, the actual reported increase in Gross Irrigated Area (GIA) over 1951-99 is only 0.49 mha. Analysis of trends show that there has been significant decline in the NIA by canals starting from the early nineties, which is cause of concern as this also provides significant ground water recharge in the semi-arid regions. The total GIA – major, medium and minor – increase is only 0.54 mha against a created irrigation potential of 2,271 mha, which indicates very poor utilisation/realisation of created potential and the decay of the existing surface irrigation systems.

The NIA by tanks in 1950-51 was 0.763 mha, which increased to a maximum of 1.34 mha by 1964-65, declining thereafter and also reflecting high variability over the years. The Net Irrigated Area from tanks show very high fluctuation (0.563 mha to 0.811 mha) during the late nineties. The irrigation intensity during 1998-99 was 115 percent. Despite the investments, there has been only a marginal increase of 0.05 mha by tank irrigation over the 1951-99 period. The strategy of investment in new tank infrastructure, while ignoring the maintenance of existing infrastructure needs a serious reassessment in view of the possible implications on groundwater

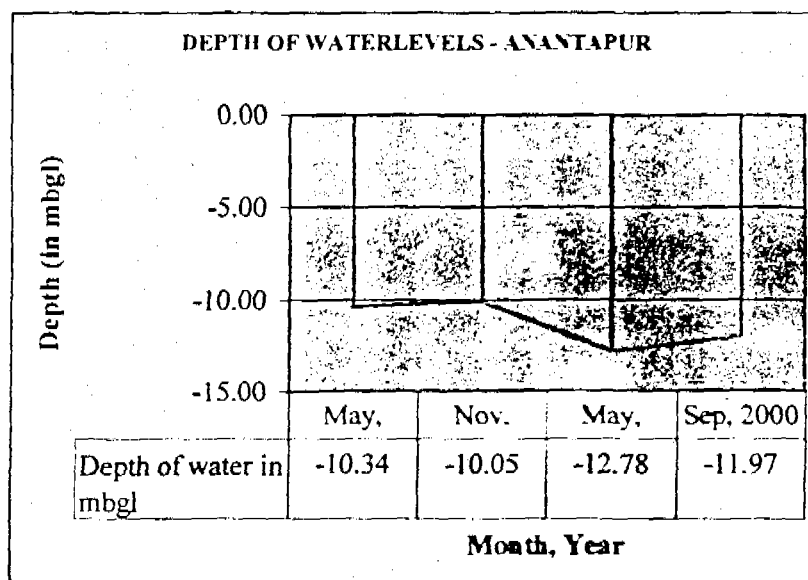
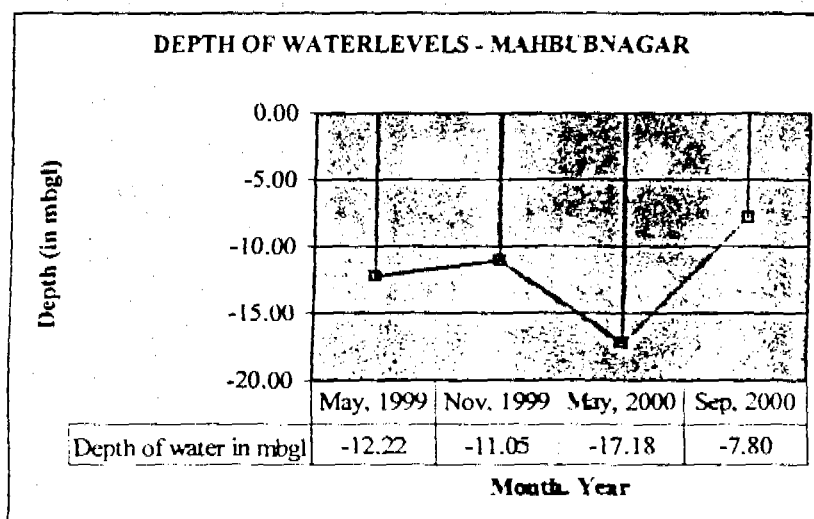
<sup>1</sup> Investment figures have been taken only upto the end of the 8<sup>th</sup> Plan period

recharge and food security in parts of the drought-prone districts. Also, the investments in the tank irrigation systems have been rendered ineffective, seemingly due to the lack of a comprehensive area-based or watershed-based approach and the decay of the older tanks and channels through negligence of basic maintenance.

In 1950, the NLA under wells was only 0.3 mha which increased to 1.897 mha by 1998-99. The irrigation intensity of ground water sources was about 139 percent in 1998-99. The phenomenal growth of irrigation based on ground water, especially since 1985-86 indicate that introduction of technologies for Deep Borewells, submersible pumps and the accompanying power subsidies<sup>2</sup> were key driving factors.

### Drinking Water Situation

The drinking water situation in the villages is likely to remain a cause for concern. The drastic lowering of groundwater levels during 1999-2000 has been recouped in most places by recharge during the rainy season of 2000. However, recovery is not indicated to the earlier levels of 1997/1998 and would thus suggest that groundwater levels will continue on a downward trend in the drier Rayalseema districts. With most of the rural population dependent on groundwater sources for drinking water, the stress is likely to be felt from February this year, much like the situation in previous years.



<sup>2</sup> The tariff for agriculture was changed from a pro-rata basis to HP-based flat rate in 1984

## Health and Nutrition

While successive Population surveys in the state (NFHS - 1 & 2) indicate declining infant and child mortality levels, increasing awareness amongst female household members of common diseases and solutions, the significant differentials between socio-economic groups and rural-urban locations is a cause for concern and points to the need for more focused orientation of existing programmes. With more than one-third of the female population deficient in nutrition, nearly a fifth of them moderately or severely anaemic, the situation of the women is slightly better than the children, amongst whom 10-14 percent were reported as severely malnourished and nearly 50 percent were reported moderately-severely anaemic.

In situations of scarcity like droughts and famines, infant mortality has been reported<sup>3</sup> to be higher during the first two years of occurrence of the event. Also, the differential in mortality across gender is adverse to the girl-child. Choe and Razzaque (1989) contend that the out-migration is higher among older children, which reduces mortality but has its impacts on schooling and other development parameters of the population.

The NSSO 50<sup>th</sup> round (1993-94) data on Nutritional intake in India reports that about 41 percent of the rural population in Andhra Pradesh receive less than the minimum calorific requirement (2,450 Kcal). Also, 10 per thousand households in rural areas do not get two square meals throughout the years. This condition magnifies in situations of scarcity like a drought.

The migration to urban areas is likely to continue in the dry districts with employment in nearby rural areas not a foreseeable provision, in current circumstances. The impact of market prices and state procurement policies will need to be monitored continuously for a clear idea of changing fortunes of farmer livelihoods. The urban centers will be the continued focus of the population seeking income from labour. This increases the vulnerability of women and children and also the elderly (who are usually left behind in the villages). In the case of women and children, it is further compounded by the higher health expenditures reported to be incurred during periods of migration. While malnutrition incidence or effects during this transition period are not documented, the living conditions and absence of food security provisions indicate that this would be a live issue. The effects of last year's crop failures will require larger recovery periods, and the increasing wage labour dependency is likely to increase the chances of malnutrition in households.

## Water for Livestock

Most surface water storage systems like tanks have filled to capacity this year, while breaches have also been reported in Mahbubnagar and Cuddapah. The effective storage from these structures is likely to be reduced in these two districts and could thus have an impact on the water table recharge. The water table is reported to be showing a declining trend in most of the Rayalseema districts, when compared to the situation two years back.

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<sup>3</sup> Choe et al. 1989, Chen, L.C. et al 1981, Bongaarts, J. and M. Cain 1981

## Fodder Availability

In districts where the crops have failed in Kharif, 2000 on account of the excessive rains, availability of required fodder is in question as the paddy crop is reported affected. The proposed cuts in power supply to agriculture are likely to affect the prospects of the winter crops and will thus reduce available fodder stock for the next year.

## Current Strategies and Gaps

The state machinery is able to respond and provide relief in drought or flood situations using its personnel resources. However, its financial resources are strained because of the adverse fiscal situation and the expenditures incurred on multiple events - drought and floods - during this financial year that has exhausted its share in the CRF. The release of the NFCR from the Central government was delayed in all the states of the country in 1999, with action finally being effected on the last day of the financial year.

The financial situation of the state government is not such that it can afford to take on two events - drought and floods - in the same year. Also, the delays in release of funds from the centre constrain the ability of the state to put in place relief efforts, evidenced in the clubbing together of all relief activity during the summer of 2000, while indications of the impacts were on record, immediately after Kharif, 1999. The fiscal situation of the state is reported to have worsened and cuts in plan expenditure are expected during FY 2000-01, which would also affect medium and longer term mitigation efforts, which are tied to state investments in Plan expenditure.

While medium-term and long-term strategies are discussed, there has been very little effort to translate these into operational and comprehensive plans at the regional level, *incorporating site specific needs*. A review of progress during 1999-2000 suggests that the state government concentrated on key areas for provision of relief - Agriculture, Food security, employment during summer and health camps. The state government also initiated the Rainwater Harvesting Programme during June 2000 with the idea of drought mitigation and augmenting groundwater. However, the need for multiple strategies aimed at resource sustainability, productivity augmentation and enhancement of options, especially to the Small and Marginal farmers along with the landless populations need serious thinking. Current initiatives like watershed development, rainwater harvesting, etc address only land or water management issues and not the throughput or market options end. Also, these strategies have traditionally benefited the valley areas and hence bypassed the small and marginal farmer community in most places.

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## Traditional water harvesting structures and new initiatives under Neeru-Meeru

*Historically, tanks were the main source of water supply in the hard rock regions of Andhra Pradesh. At the end of the First Five Year Plan, there were 58,518 tanks in Andhra Pradesh with an irrigated area of 1.07 million hectares (mha), which is about two-fifths of the irrigated area of the state. Many tanks were built in a series so that no wastage of water took place. Moreover, the storage tanks enriched the water table through percolation. An institutional system had also evolved for maintenance and enabled tanks to be the major source of irrigation.*

*In the original set of arrangements, evolved during the time of the provincial rulers, the maintenance of tanks was undertaken by the farmers in the command area. However, the rigours of the revenue collection system under the colonial rule and the negligence of the Presidency rulers forced this into gradual disuse. Post-independence, the preference of the state was clearly for larger projects and the state absolved itself of the*



*responsibility of maintaining this network. The Legislature Estimates committee which looked into minor irrigation and drainage reported (1968) that, "Kummaki kuntas or feeder channels, which feed lower tanks, are in need of repair. Normally, under the law kudimaramath for repairs to supply channels have to be attended to by the ayacutdar. But as the ryots are poor, the feeder channels or kummakki kuntas are in despair". The report went on to recommend that the tanks which were not capable of irrigating more than 4.05 ha be removed from the purview of government maintenance.*

*The Report on the minor irrigation works (1960) by the Committee on Plan Projects (Khosla Committee) strongly recommended that the master plan for restoring old tanks in Andhra Pradesh be implemented and completed during the Third Five year Plan. But, during the three subsequent five year plans only 8,442 tanks of the 50,000 tanks were restored at a cost of Rs.5.02 crore. The other recommendations of the committee related to the reduction of evaporation losses and minimising the transpiration losses. Further, in order to minimise the area of submergence, the Committee suggested a programme of desilting - cum - reclamation. There is no indication that the Andhra Pradesh Government did anything on these lines, during the subsequent period.*

*The majority of tanks in the drought - prone areas of Andhra Pradesh irrigate less than 40 ha of land. There has also been decline in the number of tanks between 1955-56 and 1986-89 in Kurnool and Anantapur. In Chittoor, Cuddapah, Mahbubnagar, and Nalgonda, the number of tanks has increased. Although the changes in the number of tanks are not unidirectional, it is interesting to note that the area irrigated under the tanks has been declining uniformly in all drought - prone areas and that too at a rate greater than the non-drought-prone areas.*

*The traditional water harvesting structures helped in stabilising livelihoods. It is to be noted that land use patterns and demand for water has changed drastically from those times to now. Changes in land use have rendered certain structures redundant and broken the earlier networks of tanks and feeder channels. Revitalisation of these structures has to be planned based on existing ground realities and it has to be understood that this would only be one of a series of many strategies to tackle the problem.*

*In June 2000, initiatives for conservation of water resources through rainwater harvesting were taken up under the Neeru-Meeru programme. This included creation of structures to hold the flow of rain water and increase recharge near water sources. Desilting of tanks was also taken up in selected areas. The programme was coordinated by the State Water Conservation Mission and targets achieved in a space of 90 days. However, there is no indication of the planning, design and monitoring of these structures being carried out on a scientific basis.*

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The relief for agriculture reached most of the beneficiaries during the summer of 2000 during the Janmabhoomi programme. In some districts, the supply of fodder also happened in May. While this would have helped the population to prepare for the Kharif of 2000, the fact remains that they had to manage for themselves during the six months after the first round of crop failures in Kharif 1999. In short, financial constraints and also the operational and political requirements of linking relief to an ongoing campaign (Janmabhoomi) seem to have resulted in a loss of focus on what is needed and when.

The impacts in agriculture increased migration in the drought affected districts (incremental migrating population varying from 10-20 percent of normal depending on local situation) during summer. Employment programmes during summer started operating only in May and June and seem to have provided more employment in the later months. This might be an indication of labour availability in the districts with migration in progress. The continuation of employment works through June-August proved a boon to the labour population, who were provided opportunities for earnings.

Reports in the villages indicate that extra provisions supplied at augmented price in the PDS were not accessed with local traders being accessed for loans and food stuffs beyond the

requirements satisfied by the PDS (normal PDS provisions and the free foodgrains (Gol announcements) were reported as received). This raises concern of the continuation or accentuation of cyclical debts amongst the marginalized households. In a situation of low employment and migration, there exists a problem in accessing provisions with low cash incomes. Also, *the strategies to address food security (supply of food grains) were implemented only during the summer months (upto June) and do not seem to have taken note of reported stress periods extending till September for the poorer sections of the population (NSSO, 50<sup>th</sup> Round 1993-94), which is most vulnerable to malnutrition.*

## ISSUES

1. The conditions of the summer of 2000 are not expected to recur in 2001 in terms of scale or magnitude. However, Drinking water supply will still be an issue of concern in the districts where groundwater levels depleted precariously during 1999-2000. Setbacks to agriculture have occurred following the droughts in 1999 and excessive rains in 2000. Groundwater depleted areas will continue to be vulnerable in terms of agriculture and drinking water supply.
2. The setbacks to the small and marginal farmers in 1999 are not expected to be wiped out over one annual cycle. The recovery period is expected to take 2-3 years.
3. The GoAP's efforts in such events are more focussed towards providing immediate relief, while some tentative steps have been made this year for longer-term drought mitigation, which need to be continued.
4. A majority of the population in rural areas and population in the poorer neighborhoods/slums of urban areas depend on hand pumps for drinking water. With, depleting groundwater levels the India Mark III hand pumps are likely to prove easier to use and more efficient in the vulnerable zones.
5. Although the state government has legislated on control of groundwater, there is no effective regulation in force. The draft bill on regulation of water resources is reported to be under the consideration of the state cabinet. Advocacy and awareness building would be required to place controls on withdrawal of groundwater. Groundwater control with conservation measures will need to be managed at village level, as the alternative top-down monitoring machinery has not been effective. Watershed planning and conservation measures are likely to prove ineffective if not accompanied by extraction controls and changes in cropping patterns.
6. While institutions for ground water monitoring and management exist at district level, it is to be noted that any legislation can only provide a framework for functioning. These institutions are grossly under-manned from the view-point of responsibilities arising from any such legislation and the actual use of the resources is by a large population of farmers and others who operate at the village/settlement level. Conservation or control of resource use can be effected only at the village/ regional level and this would require involvement of the user population in the villages.

7. Watershed coordination committees, Water and sanitation committees, water conservation committees exist at district and sub-district levels for coordination, management and delivery of different programmes. But they are not mandated nor do they have the capacity at present to manage a resource like ground water which has multiple demands on it.
8. The GoAP is facing a financial resource crunch, which may have its impacts on supply of material for drinking water supply and other rural development activities.
9. A few NGOs are active in the affected districts and have experience of natural resource management, Health and education issues. Most villages also have SHGs built around thrift and credit activities. There is the need to utilise their presence and experience for drought mitigation efforts using strategies that link natural resources with markets and credit.
10. Generally, there is no additional supply of medicines and supplements by the government in times of such events. The local medical authorities have to make arrangements within their annual supply and what can be collected through initiatives of local support groups.
11. Migration in the drier districts can only be mitigated to the extent that forced migration due to emergencies is controlled. There is a level of annual migration necessitated by the fact that agriculture in these districts does not provide adequate employment opportunities to people. The accent should be on emergency relief when necessary and through extension efforts for introduction of cropping systems suited for drier areas, so that basic food and nutrition security is ensured. Drier cereal/pulse crops and fruit crops (grafted Ber, Sitaphal) could be tried out in the dry districts with market linkages for incentive.
12. The vulnerable districts should be assisted to prepare a shelf of projects (portfolio) which could be taken up in the event of calamities like drought. The event of such occurrences should be used as a window of opportunity for creation of the much needed rural infrastructure and for a planned attempt at water resource conservation.

## STRATEGY FOR SHORT AND LONG TERM DROUGHT MITIGATION

The previous section concludes that while the state government organizes immediate relief after the declaration of a drought, the critical concerns are timing of delivery and availability of materials. Given that the health and nutritional status of certain sections of the population is poor even in a normal year, the absence of a strategy to mitigate adverse health impacts, other than through provision of supplements provided in the normal course through the public health care system, is an area of concern. In view of UNICEF's mandate to secure a better future for women and children, provision of safe drinking water, sanitation, preventive health care, nutritional and livelihood security would be the cornerstone of a drought mitigation strategy in the state.

A mitigation programme may comprise actions that lead to amelioration of the adverse impacts of a hazard and are akin to relief activities, other interventions that build capacities to withstand such events in the future and in certain cases such as hydrological or agricultural droughts (see Annexure B for a description of the three kinds of droughts), actions that can prevent the recurrence of such events.

An effective disaster mitigation programme, not only reduces the risk of adverse impacts of a drought condition on the population, but also leads to an overall improvement in the quality of life in the area. Thus, a mitigation programme should be a part of the overall developmental strategy for the region. While the priorities for a region may cover several areas and need to be comprehensive, different institutions may choose to focus on a set of these depending on their capacities and institutional mandates. Certain interventions may be more critical and therefore need to be addressed in the short term while others by their very nature would require to be implemented over a longer time frame.

A drought mitigation programme in the state will need to address the following needs:

- Ensure safe drinking water
- Provide immunization, nutritional supplements and preventive health care inputs and information, particularly for the vulnerable sections of the population
- Ensure food security
- Provide protective irrigation
- Implement a comprehensive water resource management strategy that is equitable (across regions, socio-economic groups and different end uses) and is sustainable.

Towards achieving these, short, medium and long-term strategies have been outlined below. Some of the interventions have wider policy implications and demand consensus building across several interest groups/ regions. Pilot projects that demonstrate ways in which such interventions can be made may be an effective strategy towards building confidence in addressing complex issues of resource management and allocation that are fundamental for drought mitigation. One such pilot project has been described in the section on medium term strategy. This is merely indicative and based on intervention areas prioritized by UNICEF and the GoAP, other pilot ideas may be developed into potential projects.

## Strategies for the Short term (One year from event)

Ensure drinking water security in the affected districts. The problem of ground water over-exploitation, rampant in most of drought-prone districts needs to be addressed to avoid drinking water shortages, especially in summer. Two broad strategies can be considered, namely: protection of ground water resources in a fixed area around the settlement; protection of deeper aquifers exclusively for drinking water needs. Site-selection for drinking water sources could preferentially be oriented to locations<sup>1</sup>, which have shown groundwater supplies even during consecutive drought years. Other methods like restriction on pump capacities; period of extraction also can be tried based on resource stocks, rainfall conditions and usage patterns. Rainfall trends in the districts need to be monitored on a monthly basis and updates from the Department of Agriculture taken when crop estimation is carried out. This should provide feedback for the local water management strategy.

In identified vulnerable districts the supply of Hand pumps with spares and pipes to the department should be ensured before December so that installation and works can be completed prior to February, before the onset of summer.

Medicine supplies and immunization for combating possible outbreak of communicable diseases should be planned using this information, by the end of the rainy season. Vitamin and mineral supplements need to be provided on a regular basis to address malnutrition, especially to vulnerable groups (socio-economic groups, women, children, the elderly).

The drought prone areas have short periods of food surplus followed by extended periods of deficit when they rely on markets to meet basic food requirements. At such times nutritional requirements may be compromised with higher emphasis on cereals, at the cost of vegetables, especially by the vulnerable sections. To address this, cultivation and consumption of food items rich in vitamins and minerals can be promoted in the area. Information and inputs for kitchen gardens that meet basic nutritional supplementation needs can be promoted and subsidized in the case of vulnerable groups (landless, SC and ST communities, women headed household and the infirm). The APWELL project, supported by the Dutch government has demonstrated that SHGs can be mobilised to grow vegetable on leased land by landless communities. These learnings can be applied to build nutritional self-sufficiency within the weaker communities.

Food for Work and Employment Assurance programmes are designed to prevent distress migration, ensure food security while creating local asset. However, they often start late in the season, after migrations have taken place and end too early, just at the start of the monsoon season while food scarcity continues till Kharif crops are harvested. While there are adequate buffer stocks with the FCI, the state government is unable to access these in time due to resource constraints. There is a potential for donor interventions to bridge this gap. This can enable the timely initiation of such programmes resulting in significant improvements in food security and reduction of distress migration.

TPDS and local grain banks can be strengthened to meet local needs for cereal and pulses. SHGs can be mobilized to operate and manage the grain banks.

<sup>1</sup> In the southern districts Coastal and Rayalseema – the 1999-2000 years provide an opportunity.

Besides deficient rainfall, factors that lead to a drought condition are low out-turn of crops and/or lack of remunerative prices for the produce. While the state government (Department of Agriculture) monitors basic agricultural commodity prices and prepares estimates of crop out-turn from different mandals in Andhra Pradesh, the crop out-turn estimates are usually ready only towards the end of the financial year. They do not provide information which can help in initiation of Food For Work (FFW) or Employment Assurance Programmes. In the event of the declaration of a calamity, these estimations are speeded up, but provide little policy directions. Timely estimates and price information by the end of the Kharif season would provide additional information for planning and initiation of drought mitigation measures.

Agriculture Cooperatives exist in the districts, which provide agriculture credit, input supply and marketing support to the farmer members. However, these cooperatives have tended to benefit the larger farmers more than the small and marginal farmers. Occasions of seasonal crop failures or repetitive crop failures restrict the capacity of farmers to invest in the next crop, which is essential for ensuring their recovery. Self-Help Groups or Farmer Groups need to be supported, to access inputs in a timely manner at the start of the season. Donors can support this process through financial support, which enable such groups to access institutional credit. Farmer groups can be also encouraged to start seed-banks, which foster self-sufficiency and reduce reliance on markets.

The state government initiated the Rainwater Harvesting Programme with an outlay of Rs. 300 million, covering all districts over a period of 90 days, with the idea of drought mitigation and augmenting groundwater resources. The design of rainwater harvesting structures have been provided based on standard designs provided by Central Ground Water Board and the State Ground Water Department (SGWD) and the construction has been carried out mostly by the engineers of the PRED-Rural Water Supply. Monitoring of the progress and performance of rainwater harvesting structure constructed during 2000 is important to understand the efficacy of such measures and to evolve better strategies for rainwater conservation and use. Technical Assistance and training to the personnel in charge of rural water supply, on water harvesting and conservation methods would be necessary.

#### • **Medium term (1-3 years)**

Assistance in ensuring drinking water supply security will need to continue, with focus on allocation of water resources across different end-uses. While the fortunes of agriculture need to be monitored to provide an idea of likely migration and other impacts on population, drinking water will remain the prime area of concern in the areas where groundwater levels are going down.

Given the current status of agricultural development and its reliance on ground water, any kind of sustainable water use strategy would require changes in cropping patterns, impacting returns from agriculture for some farmers in the short-term. Technical inputs for dryland farming from ICRISAT, CRIDA, CAZRI (Rajasthan) can be focused on such areas in the form of an action project, which involves Soil and Water Conservation measures as well as support towards sustainable changes in the crop mix.

Past data on dried-up borewells and seasonal hand pumps can be used to prioritise and target villages. Hand pump supplies with all necessary accessories need to be ensured by December so that installation can be taken up before drinking water problems start in the villages.

Considering the spatial variations observed in the drought phenomenon, identification of vulnerable areas would need an integrated analysis of water resource data – surface and ground – agricultural practices, cropping patterns and also socio-economic grouping of the population based on primary livelihoods. While the different agencies of the government have the necessary information within their system<sup>2</sup>, UNICEF would be rightly placed, along with other donor agencies in the state to initiate planned integration of these data sets for prioritization and interventions to decrease vulnerabilities, in the medium and long term.

Supplement Primary healthcare initiatives through increased and targeted supplies, backed by intensive awareness building to lessen morbidity and mortality due to communicable diseases and malnutrition. A sustained campaign mode might be an effective mechanism. This should be accompanied by provisioning of supplies in advance, involvement of health care personnel for sharing of operational strategies in different districts and also awareness building campaigns within the villages to make people aware of the need for supplements and status of availability.

### **Long term (3 – 7 yrs)**

While dialogue would be required with central and state governments to provide adequate policy inducements and infrastructure creation to encourage a gradual shift in cropping pattern in the drier areas towards dry region cereals and pulses and also remunerative fruit crops. local level management of natural resources, especially water is critical. Also, the constraints posed to water management arising from structural and policy initiatives – skewed subsidization to irrigated and un-irrigated areas in agriculture - need to be addressed through appropriate incentive/disincentive mechanisms to streamline the inputs, second-order processing and the markets in agriculture.

Advocacy with central government would be required to plan and effectively utilize excess stocks of foodgrains and also link up this utilization with creation of necessary rural infrastructure.

A District level drought mitigation forum may be considered, which could comprise scientists, administrators, farmer groups, chosen elected representatives and civil society groups. This think tank can help in evolving strategies, building consensus, function as a storehouse of experience and information and advise on future initiatives in drought mitigation.

The state government has created the State Water Conservation Mission (SWCM), with the mandate for coordinated planning and management of water resources throughout the state. The SWCM had overseen the time-bound implementation of the Neeru-Meeru programme during 2000. While it is housed in the Panchayat Raj and Rural Development department, it has representation from the departments of Agriculture, Ground water, Geology & Mines and Public Health. The proposed legislation and control mechanisms for ground water resources will require extensive consensus building and capacities for implementation. Donors like UNICEF might consider providing assistance to enhance the capacities of this institution for decentralized management and control.

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<sup>2</sup> The water resource data is available with the PRED-RWS and the SGWD, agriculture data with the DoA and the research institutions like ICRISAT and the socio-economic data with the DoF&P (Multi-purpose Household Data collected in early 2000).

UNICEF can also build technical capacities of implementing agencies like the PRED-RWS and the DoPH, to ensure drinking water security through interventions for source sustainability.

### Indicative Pilot Project

#### Decentralized water management Strategy

The objectives of this pilot would be to:

1. Demonstrate the possibility of village level water resource monitoring
2. Establish institutional mechanisms for sustainable water resource management
3. Enhance capacities to withstand meteorological droughts
4. Develop a set of sustainable, remunerative but low water intensive cropping options
5. Ensure nutritional self-sufficiency of poor and vulnerable communities even in low rainfall years

The area for implementation of the pilot may be prioritized based on secondary data available with the departments (Refer Annexure F for checklist). A district-level spatially explicit database, incorporating surface water and ground water situation at settlement levels can be developed and villages classified on the basis of surface and ground water dependency. After ascertaining surface water (tanks and canals) availability, this database can be used for prioritizing immediate action, in the event of drought conditions.

The database can be used as the basis to carry out a survey of selected villages to arrive at a listing of causes for water scarcity. From this list, typical villages that reflect each problem-set can be identified and a detailed study of resources, processes and their interactions can be initiated. This will enable identification of issues pertaining to village-level water resource management and control and options for such settlements.

A few villages can be chosen from this based on socio-economic parameters and the presence of CBO/NGO. Through village level interactions and aids such as simulation games, audio and visual media, extra-curricular programmes in schools; awareness about key issues related to water management can be created. Using a PLA methodology, possible strategies to address these can be developed using local knowledge in consonance with external expertise. Focus group discussions with women, especially from vulnerable and landless communities can be carried out to ascertain the nutrition status of the households and possibility of local initiatives to raise kitchen gardens for satisfying nutrition requirements during scarcity periods. Various management options could be explored with the villagers for their social sustainability and equity. The interventions would seek to conserve water resources and stabilize agriculture production and incomes. Technical expertise on dryland farming can be utilized from CRIDA, ICRIAT and CAZRI (Rajasthan). Villagers as the users will play a central role in planning and implementation of SWC activities.

Mechanisms to monitor extraction of ground water and to control its over-exploitation will be put in place. These may take the form of area and or depth restrictions on drilling new borewells, control over cultivation of water intensive crops or seasonal restrictions on pumping ground water. SHGs will be encouraged to initiate the concept of grain bank, kitchen gardens, if felt feasible. The Janmabhoomi programme, Village Water and Sanitation Committees, Gram Sabha meetings, Neeru-Meeru programme, Watershed Committees and other local forum may be used to build a settlement/village level consensus.

The strategic responses are briefly indicated in the table below to provide the nature of response from UNICEF within the overall mitigation framework.



STRATEGIC RESPONSE FOR DROUGHT MITIGATION			
	Role of UNICEF		
	Direct	Support	Influence
<b>Short-Term</b>			
Assist in ensuring Drinking water supply in rural and urban areas.	X		X
Work with administration on strategies for protection of groundwater for drinking water.	X		X
Medicine supplies and immunisation by the end of the rainy season.	X		X
Assistance in supply of vitamins and mineral supplements along with campaign to address malnutrition	X		X
Nutritional security through supplementary supplies for elderly and lactating mothers, promotion of kitchen garden through kits		X	
FFW/EAS for achieving food security with clear mandate to provide this in critical months		X	X
Strengthen TPDS and local grain banks to meet local needs for cereal and pulses. SHGs can be mobilized to operate and manage the grain banks.		X	X
Technical assistance to State government agencies for timely preparation of crop estimates and commodity price trends	X		X
Support to Farmers groups for seed banks or credit initiatives		X	
Technical Assistance and training to the personnel in charge of rural water supply, on water harvesting and conservation methods would be necessary.	X		
<b>Medium term (1-3 years)</b>			
Continued assistance in ensuring drinking water supply security, with focus on allocation of water resources across different end-uses.	X		X
Assist in bringing technical inputs from ICRIAT, CRIDA, CAZRI (Rajasthan) for dryland farming as well as support towards sustainable changes in the crop mix.		X	
Prioritisation of Villages through integrated analysis of water, agriculture and social data	X		X

<b>STRATEGIC RESPONSE FOR DROUGHT MITIGATION</b>			
	<b>Role of UNICEF</b>		
	<b>Direct</b>	<b>Support</b>	<b>Influence</b>
Supplement Primary healthcare initiatives through increased and targeted supplies, backed by intensive awareness building to lessen morbidity and mortality due to communicable diseases and malnutrition.	X		X
<b>Long term (3 – 7 yrs)</b>			
Efforts to change cropping pattern in drier areas			X
Incentive/disincentive to correct skewed subsidies			X
Utilisation of buffer foodgrain stocks and link with creation of rural infrastructure			X
District Drought Mitigation forum for local level planning and mobilisation	X		X
Assistance to SWCM for evolving decentralised management and control of water resources	X		X
Support technical capacity building of agencies (PRED-RWS) to augment source sustainability and thus ensure drinking water security	X		
<b>Note:</b>			
<b>Direct</b> - Where the activity falls within UNICEF's portfolio of activities			
<b>Support</b> - Where the activity is grounded by another agency and UNICEF provides assistance			
<b>Influence</b> - Where activity falls within realm of government policy and UNICEF influences			

**ANNEXURE A**

<b>SELECTED DEMOGRAPHIC DATA FOR URBAN - ANDHRA PRADESH</b>																
Districts	No. of Households	Total Male Population	Total Female Population	Total Population	Males below 7 years	Females below 7 years	Population below 7 years	Males above 60 years	Females above 60 years	Population above 60 years	Male SC	Female SC	Population SC	Male ST	Female ST	Population ST
SRIKAKULAM	60,867	145,011	145,227	290,238	21,591	21,066	42,657	7,460	9,420	16,880	12,835	13,261	26,096	1,595	1,247	2,842
VIZIANAGARAM	77,626	181,140	182,360	363,500	26,155	25,558	51,713	8,780	10,881	19,661	20,118	20,564	40,682	2,282	2,144	4,426
VINAKHAPATNAM	286,155	671,562	637,021	1,308,583	93,155	90,224	183,379	25,610	31,940	57,550	59,856	58,185	118,041	4,499	3,505	8,004
EAST GODAVARI	242,211	540,665	540,139	1,080,804	78,532	78,737	157,269	27,630	32,504	60,134	65,880	66,203	132,083	4,335	3,611	7,946
WEST GODAVARI	163,870	364,165	364,388	728,553	51,081	48,997	100,078	19,650	22,475	42,125	37,139	36,684	73,823	3,669	3,505	7,174
KRISHNA	293,152	671,697	653,257	1,324,954	96,618	92,349	188,967	34,410	38,954	73,364	58,642	57,280	115,922	10,721	10,279	21,000
GUNTUR	261,799	600,267	586,433	1,186,700	85,106	82,492	167,598	35,236	37,519	72,755	53,721	51,720	105,441	19,440	17,952	37,392
PRAKASAM	99,614	229,711	224,191	453,902	31,573	30,583	62,156	13,600	15,126	28,726	23,520	23,326	46,846	8,933	8,597	17,530
NELLORE	124,673	287,466	281,596	569,062	44,545	36,870	81,415	14,706	17,974	32,680	33,957	34,014	67,971	18,590	18,013	36,603
CHITTOOR	136,281	330,727	315,105	645,832	44,051	42,263	86,314	18,311	19,580	37,891	29,950	28,730	58,680	5,714	5,305	11,019
CUDDAPAH	109,770	278,059	266,914	544,973	41,388	39,843	81,231	13,594	17,480	31,074	23,348	22,679	46,027	3,489	3,164	6,653
ANANTAPUR	143,562	383,178	364,875	748,053	58,383	56,717	115,100	21,495	22,380	43,875	33,460	32,332	65,792	6,359	5,717	12,076
KURNOOL	139,971	394,000	374,100	768,100	65,813	63,639	129,452	18,631	20,056	38,687	52,106	50,266	102,372	5,943	5,059	11,002
MAHBUBNAGAR	58,664	175,828	166,364	342,192	29,497	28,258	57,755	9,273	9,960	19,233	15,454	14,446	29,900	2,063	1,671	3,734
RANGAREDDI	247,930	626,166	579,011	1,205,177	100,838	97,008	197,846	25,950	28,050	54,000	72,445	69,736	142,181	11,698	10,179	21,877
HYDERABAD	533,748	1,627,249	1,518,690	3,145,939	256,178	246,670	502,848	78,897	83,650	162,547	141,248	137,491	278,739	15,063	13,883	28,946
MEDAK	60,650	168,807	159,680	328,487	29,346	28,581	57,927	7,412	9,315	16,727	16,939	16,534	33,473	1,644	1,300	2,944
NIZAMABAD	74,829	209,031	203,913	412,944	36,841	35,378	72,219	10,069	11,600	21,669	16,591	16,904	33,495	2,235	2,042	4,277
ADILABAD	95,382	246,743	234,833	481,576	45,075	43,692	88,767	10,389	10,530	20,919	37,830	36,283	74,113	5,790	5,099	10,889
KARIMNAGAR	130,002	318,761	305,558	624,319	55,773	52,651	108,424	11,686	14,739	26,425	37,496	36,432	73,928	3,153	2,979	6,132
WARANGAL	108,197	279,600	267,022	546,622	43,538	41,480	85,018	14,297	15,060	29,357	36,440	34,996	71,436	8,163	7,491	15,654
KHAMMAM	93,865	227,562	220,601	448,163	35,046	34,147	69,193	10,200	11,370	21,570	29,668	29,545	59,213	16,109	15,760	31,869
NALGONDA	67,675	175,311	163,142	338,453	26,938	26,306	53,244	7,580	8,780	16,360	19,229	17,942	37,171	5,180	4,058	9,238
<b>ANDHRA PRADESH</b>	<b>3,610,493</b>	<b>9,132,706</b>	<b>8,754,420</b>	<b>17,887,126</b>	<b>1,397,061</b>	<b>1,343,509</b>	<b>2,740,570</b>	<b>444,866</b>	<b>499,343</b>	<b>944,209</b>	<b>927,872</b>	<b>905,553</b>	<b>1,833,425</b>	<b>166,667</b>	<b>152,560</b>	<b>319,227</b>

**SELECTED DEMOGRAPHIC DATA FOR RURAL - ANDHRA PRADESH**

Districts	No. of Households	Total Male Population	Total Female Population	Total Population	Males below 7 years	Females below 7 years	Population below 7 years	Males above 60 years	Females above 60 years	Population above 60 years	Male SC	Female SC	Population SC	Male ST	Female ST	Population ST
SRIKAKULAM	447,902	1,008,808	1,022,080	2,030,888	175,097	172,916	348,013	68,281	73,982	142,263	95,603	95,199	190,802	65,636	65,589	131,225
VIZIANAGARAM	383,091	874,195	873,248	1,747,443	141,776	141,651	283,427	55,500	58,360	113,860	91,381	88,289	179,670	92,711	93,048	185,759
VISAKHAPATNAM	445,975	991,687	984,822	1,976,509	164,264	163,218	327,482	55,200	63,273	118,473	71,225	67,670	138,895	231,426	229,456	460,882
EAST GODAVARI	800,666	1,732,297	1,728,121	3,460,418	293,021	290,517	583,538	113,540	114,760	228,300	348,158	345,816	693,974	83,935	84,202	168,137
WEST GODAVARI	641,099	1,399,926	1,389,089	2,789,015	226,063	223,658	449,721	99,740	96,640	196,380	280,368	275,042	555,410	38,491	38,983	77,474
KRISHNA	558,503	1,207,092	1,166,787	2,373,879	191,373	185,303	376,676	98,020	89,324	187,344	254,635	242,673	497,308	36,388	34,379	70,767
GUNTUR	677,931	1,484,213	1,436,086	2,920,299	225,240	218,412	443,652	128,610	121,980	250,590	239,868	228,098	467,966	74,196	70,000	144,196
PRAKASAM	494,593	1,170,758	1,134,506	2,305,264	189,990	184,151	374,141	98,312	95,316	193,628	257,794	248,000	505,794	42,111	39,213	81,324
NELLORE	423,493	920,914	902,284	1,823,198	141,223	137,130	278,353	69,191	67,937	137,128	230,099	224,749	454,848	91,396	86,063	177,459
CHITTOOR	556,022	1,327,786	1,287,500	2,615,286	200,063	194,492	394,555	94,330	100,548	194,878	275,249	265,587	540,836	48,386	45,533	93,919
CHIDAMPAL	373,254	881,903	840,893	1,722,796	133,429	129,322	262,751	54,350	62,240	116,590	150,234	141,678	291,912	21,128	19,633	40,761
ANANTAPUR	476,365	1,252,818	1,182,943	2,435,761	216,704	207,958	424,662	85,980	82,500	168,480	198,595	187,423	386,018	51,113	48,018	99,131
KURNOOL	410,169	1,128,618	1,076,306	2,204,924	217,511	207,075	424,586	65,740	73,670	139,410	213,812	201,924	415,736	23,258	22,195	45,453
MAHBUBNAGAR	501,438	1,383,788	1,351,070	2,734,858	269,147	264,667	533,814	98,584	94,770	193,354	260,563	251,917	512,480	114,808	108,863	223,671
RANGAREDDI	246,634	688,394	658,395	1,346,789	131,475	128,879	260,354	49,067	47,010	96,077	151,844	145,361	297,205	44,740	42,777	87,517
HYDERABAD							0	0	0	0			0			0
MEDAK	352,514	983,272	958,041	1,941,313	179,013	175,771	354,784	79,441	76,550	155,991	188,371	183,878	372,249	47,306	44,792	92,098
NIZAMABAD	320,163	800,982	823,695	1,624,677	138,308	136,154	274,462	59,030	66,680	125,710	134,007	140,495	274,502	58,921	57,518	116,439
ADILABAD	327,682	805,269	795,634	1,600,903	151,233	149,805	301,038	50,670	51,830	102,500	157,342	154,487	311,829	174,079	169,934	344,013
KARIMNAGAR	513,854	1,211,030	1,202,137	2,413,167	186,695	184,823	371,518	110,290	104,520	214,810	247,292	242,403	489,695	39,750	37,745	77,495
WARANGAL	478,633	1,157,066	1,115,144	2,272,210	199,634	196,047	395,681	94,484	84,180	178,664	212,337	200,881	413,218	190,975	178,690	369,665
KHAMMAM	379,548	902,465	865,181	1,767,646	159,167	156,288	315,455	62,742	55,880	118,622	154,957	145,984	300,941	268,043	259,046	527,089
NALGONDA	517,433	1,278,594	1,235,045	2,513,639	224,778	220,715	445,493	102,138	91,530	193,668	237,782	229,253	467,035	137,955	128,445	266,400
ANDHRA PRADESH	10,326,962	24,591,875	24,029,007	48,620,882	4,155,204	4,068,952	8,224,156	1,793,240	1,773,480	3,566,720	4,451,516	4,306,807	8,758,323	1,976,752	1,904,122	3,880,874

SELECTED DEMOGRAPHIC DATA FOR URBAN & RURAL - ANDHRA PRADESH

Districts	No. of Households	Total Male Population	Total Female Population	Total Population	Males below 7 years	Females below 7 years	Population below 7 years	Males above 60 years	Females above 60 years	Population above 60 years	Male SC	Female SC	Population SC	Male ST	Female ST	Population ST
SIKAKULAM	508,769	1,153,819	1,167,307	2,321,126	196,688	193,982	390,670	75,741	83,402	159,143	108,438	108,460	216,898	67,231	66,816	134,067
VIZIANAGARAM	460,717	1,055,335	1,055,608	2,110,943	167,931	167,209	335,140	64,280	69,241	133,521	111,499	108,853	220,352	94,933	95,192	190,185
VISAKHAPATNAM	732,130	1,663,249	1,621,843	3,285,092	257,419	253,442	510,861	80,810	95,213	176,023	131,081	125,855	256,936	235,925	232,961	468,886
EAST GODAVARI	1,042,877	2,272,962	2,268,260	4,541,222	371,553	369,254	740,807	141,170	147,264	288,434	414,038	412,019	826,057	88,270	87,813	176,083
WEST GODAVARI	804,969	1,764,091	1,753,477	3,517,568	277,144	272,655	549,799	119,390	119,115	238,505	317,507	311,726	629,233	42,160	42,488	84,648
KRISHNA	851,655	1,878,789	1,820,044	3,698,833	287,991	277,652	565,643	132,430	128,278	260,708	313,277	299,953	613,230	47,109	44,658	91,767
GHANTUR	939,730	2,084,480	2,022,519	4,106,999	310,346	300,904	611,250	163,846	159,499	323,345	293,589	279,818	573,407	93,636	87,952	181,588
PRAKASAM	594,207	1,400,469	1,358,697	2,759,166	221,563	214,734	436,297	111,912	110,442	222,354	281,314	271,326	552,640	51,044	47,810	98,854
NELLORE	548,166	1,208,380	1,183,880	2,392,260	185,768	174,000	359,768	83,897	85,911	169,808	264,056	258,763	522,819	109,986	104,076	214,062
CHITTOOR	692,303	1,658,513	1,602,605	3,261,118	244,114	236,755	480,869	112,641	120,128	232,769	305,199	294,317	599,516	54,100	50,838	104,938
CHIDAMPAL	483,024	1,159,962	1,107,807	2,267,769	174,817	169,165	343,982	67,944	79,720	147,664	173,582	164,357	337,939	24,617	22,797	47,414
ANANTAPUR	619,927	1,635,996	1,547,818	3,183,814	275,087	264,675	539,762	107,475	104,880	212,355	232,055	219,755	451,810	57,472	53,735	111,207
KURNOOL	550,140	1,522,618	1,450,406	2,973,024	283,324	270,714	554,038	84,371	93,726	178,097	265,918	252,190	518,108	29,201	27,254	56,455
MAHABUBNAGAR	560,102	1,559,616	1,517,434	3,077,050	298,644	292,925	591,569	107,857	104,730	212,587	276,017	266,363	542,380	116,871	110,534	227,405
RANGAREDDI	494,564	1,314,560	1,237,406	2,551,966	232,313	225,887	458,200	75,017	75,060	150,077	224,289	215,097	439,386	56,438	52,956	109,394
HYDERABAD	533,748	1,627,249	1,518,690	3,145,939	256,178	246,670	502,848	78,897	83,650	162,547	141,248	137,491	278,739	15,063	13,883	28,946
MEDAK	413,164	1,152,079	1,117,721	2,269,800	208,359	204,352	412,711	86,853	85,865	172,718	205,310	200,412	405,722	48,950	46,092	95,042
NIZAMABAD	394,992	1,010,013	1,027,608	2,037,621	175,149	171,532	346,681	69,099	78,280	147,379	150,598	157,399	307,997	61,156	59,560	120,716
ADILABAD	423,064	1,052,012	1,030,467	2,082,479	196,308	193,497	389,805	61,059	62,360	123,419	195,172	190,770	385,942	179,869	175,033	354,902
KARIMNAGAR	643,856	1,529,791	1,507,695	3,037,486	242,468	237,474	479,942	121,976	119,259	241,235	284,788	278,835	563,623	42,903	40,724	83,627
WARANGAL	586,830	1,436,666	1,382,166	2,818,832	243,172	237,527	480,699	108,781	99,240	208,021	248,777	235,877	484,654	199,138	186,181	385,319
KHAMMAM	473,413	1,130,027	1,085,782	2,215,809	194,213	190,435	384,648	72,942	67,250	140,192	184,625	175,529	360,154	284,152	274,806	558,958
NALGONDA	585,108	1,453,905	1,398,187	2,852,092	251,716	247,021	498,737	109,718	100,310	210,028	257,011	247,195	504,206	143,135	132,503	275,638
ANDHRA PRADESH	13,937,455	33,724,581	32,783,427	66,508,008	5,552,265	5,412,461	10,964,726	2,238,106	2,272,823	4,510,929	5,379,388	5,212,360	10,591,748	2,143,419	2,056,682	4,200,101

## ANNEXURE B

### DROUGHTS vs OTHER NATURAL DISASTERS

[Adapted from 1997 World Disaster Reduction Campaign – Information Kit, IDNR 2000-2001, United Nations Department of Humanitarian Affairs]

#### What is a Drought ?

Compared to other natural disasters such as earthquakes, hurricanes, floods or volcanic eruptions, the nature and impact of drought are more difficult to assess. Its effects are pervasive and make drought management difficult. A few points on what makes drought different from other natural disasters?

#### It is Slow

Most natural disasters are "rapid-onset", meaning that they happen quickly with little or no warning. Drought is the exception: it is hard to recognise when a dry spell becomes a drought. It has no epicentre or path. It takes months to establish itself and may persist for months, years or decades. The effects are cumulative, growing in magnitude with each additional day of drought.

#### It's misunderstood and underestimated

The absence of a precise universal definition of drought makes it harder to figure out whether a region suffers from drought and how bad the drought is. Therefore, decision makers may be too late to take action or may do so only when the effects are dramatic.

#### Its worst effects are indirect and long term

The effects of drought are less obvious and spread over a longer time period and larger geographical area than the effects of other natural hazards. Drought seldom results in structural damage, in contrast to earthquakes, floods and hurricanes.

**Drought, however, deserves as much attention in terms of visibility, management and prevention efforts as any other natural disaster for the following reasons:**

#### It brings out the worst

Unlike other natural disasters, drought tends to drive people apart rather than bring them together. Conflicts between people, communities and governments competing for water resources are typical of droughts. Often, poor social conditions or unstable political situations are already in place and further exacerbated when drought occurs.

## **It's expensive**

Droughts cost as much as faster-moving disasters in terms of economic losses and deaths. For example, the 1987-89 drought in the US cost an estimated \$39 billion and affected 70 percent of the country's population. In comparison, researchers have estimated a worst-case hurricane at \$7 billion and a worst case earthquake at \$30 to \$50 billion.

## **It's widespread**

The geographic coverage and population affected by a drought is usually wide-spread and not localized as seen in other disasters. The socio-economic impacts sometimes extend beyond the affected region.

## **Some Types of Droughts**

**Meteorological drought** is a change in precipitations from the normal rate over a given period of time. This comparison must be region-specific and based on a thorough understanding of regional climatology.

**Hydrological drought** refers to deficiencies in surface and sub-surface water supplies such as streams, ground water, lakes and reservoirs.

**Agricultural drought** occurs when there is not enough soil moisture to meet the needs of a particular crop at a particular time. When precipitation is reduced or deficient over an extended period of time, this shortage will be reflected in the declining surface and subsurface water levels. **Famine** can be regarded as an extreme form of agricultural drought where food shortages are so severe that large numbers of people become unhealthy or die. There is usually a correlation between other factors such as war and conflict and famine is generally effected by human action.

## **The Causes of drought**

### **Lack of rain**

The reasons for lack of rain are not well understood. Displacement of the normal path of the jet stream may steer storms elsewhere. Recent research has focused on global scale interactions between the atmosphere and the oceans. Sea surface temperature anomalies (SSTAs) influence heat and moisture so that warm surface water creates air conditions favorable to cyclone formation.

### **Human causes**

Land use practices that give rise to desertification such as deforestation, over cultivation, overgrazing, and mismanagement of irrigation are thought to result in greater persistence of drought. Traditional drought coping systems in Africa, such as shepherd's use of seasonal grazing lands and farmers' use of fallow periods, have been reduced due to population and economic pressures.

## What makes communities vulnerable?

Drought is more likely in dry areas with limited rainfall. Drought-related effects will be more severe in countries with existing food shortages and for largely subsistence level farming and pastoralist communities. In these areas, drought can lead more easily to famine and deaths. Most famine related deaths occur in the semi-arid countries of sub-Saharan Africa. In more developed countries, the consequences of drought are largely economic.

## References:

National Drought Management Centre Information Sheets on Drought

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*Introduction to Hazards*, third edition, Disaster Management Training Programme, UNDP/DHA, 1997.



## ANNEXURE C

### Existing Policy for Disaster Management

Traditionally, relief in the wake of natural calamities including slow onset phenomena like droughts, has been treated as the primary responsibility of the States and successive Finance Commissions have reiterated this position. The Central Government associates itself with measures aimed at ameliorating the sufferings of the people on account of natural calamities through the use of its physical and financial resources. The dimensions of the response at the level of National Government are determined in accordance with the existing policy of financing the relief expenditure and keeping in view the factors like (i) the gravity of a natural calamity, (ii) the scale of the relief operation necessary, and (iii) the requirements of Central assistance for augmenting the financial resources at the disposal of the State Government.

The National Crisis Management Committee (NCMC) and the Inter-Ministerial Coordination Group (IMCG) are the two bodies constituted to advise the MoA and the Cabinet on steps to be taken, in the event of a crisis.

The Central response can be a Policy response – enunciated by the Prime Minister, cabinet and the Minister for Agriculture, seeking to empathise with the affected population or to complement the long term and short term policy objectives of the state governments – or an administrative response arising from a follow-up of a stated policy objective; the need for an assessment of the situation to decide the central response; the state's request for assistance or the need for information.

The Central Government's response, at the policy level, to a natural calamity would lead to Central initiatives such as:

1. visits of the calamity affected areas by President, Prime Minister and other dignitaries;
2. activation of the administrative machinery for assisting in relief measures; and
3. setting up of the machinery for implementing, reviewing and monitoring of relief measures.

The administrative response at the Central Government level would broadly relate to:

1. operational requirements
2. provision of Central assistance as per existing policy.

The operational aspects of the administrative response have been further classified as primary and secondary functions outlined below.

The Primary Relief functions are enunciated as:

1. Forecasting and operation of warning system
2. Maintenance of uninterrupted communication
3. Wide publicity to warnings of impending calamity, disaster preparedness and relief measures through TV, AIR and Newspapers

4. Transport with particular reference to evacuation and movement of essential commodities and petroleum products
5. Ensuring availability of essential commodities at reasonable prices particularly the commodities through the Public Distribution System
6. Ensuring availability of medicines, vaccine and drugs
7. Preservation and restoration of physical communication links
8. Investments in infrastructure and
9. Mobilisation of financial resources.

The secondary functions of the Central Government which supplement the States' relief efforts, relate to:

1. Flood/inflow forecasts from the Central Water Commission
2. Relief, rehabilitation and restoration through military aid to civil authorities
3. Contingency plans for crops, cattle preservation nutrition and health measures
4. Technical and technological inputs for provision of drinking water
5. Technical assistance in the water budgeting and water management for various uses, and
6. Coordination of the activities of the State agencies and voluntary agencies.

The Departments or Ministries responsible for these above functions are outlined in Annexure D.

#### **Provision of Central Assistance**

The present scheme of financing the relief expenditure arising out of natural calamities has come into force (April 01, 1990), consequent upon the acceptance of the recommendations of the Ninth Finance Commission (NFC). Under this scheme, a Calamity Relief Fund<sup>1</sup> (CRF) is constituted for each State with the Central Government contributing 75 percent in four quarterly installments and the balance 25 percent provided by the State Governments from its own resources. Following the constitution of the CRF, it is the responsibility of the State Government to meet all expenditure arising out of the natural calamities. The NFC also directed that the fund be maintained as a separate account in a nationalised bank, outside the general revenues and Public Account of the state and be administered by a committee headed by the Chief Secretary of the state.

As per the recommendations of the Tenth Finance Commission, an Expert Committee prepared (1995) a list of items eligible for expenditure under the CRF. While the states have asked for modifications to the list, the EFC has maintained that adherence to this list is essential provided that the list incorporates local needs and requirements. The norms for expenditure on each approved item is fixed by the State Level Committee, which informs the MoA.

<sup>1</sup> The size of the Fund for each state was determined by considering the average of actual ceiling of expenditure approved for a state over the 1979-89 period. The total amount worked out for all the states amounted to Rs. 8,040 million annually during the 1990-95 period. The Tenth Finance Commission re-worked this amount taking into account the average of aggregate of ceilings of expenditure for the years 1984-89 and the CRF for 1990-93, adjusted for inflation. The amount thus worked out for all the states for the 1995-00 period was Rs. 63,043 million.

The Tenth Finance Commission (TFC) had recommended the constitution of a separate central fund – the National Fund for Calamity Relief (NFCR) – under the Ministry of Agriculture, to provide assistance to states affected by natural calamity of rare severity. The TFC fixed the size of the fund at Rs. 7,000 million, to be built up over the period of 1995-00, to which the centre and states would contribute in the ratio 75:25. The TFC did not fix any criteria or definition for deciding a calamity to be of rare severity. While it indicated some parameters like intensity of event, level of assistance needed and capability of state to address the problem, it suggested that the decision be made on a case-to-case basis. The NFCR was to be managed by a National Calamity Relief Committee<sup>2</sup> (NCRC). The guidelines issued by the MoF empowered the NCRC to decide on the severity of the calamity based on recommendations of an Inter-Ministerial Group (IMG) that is informed by the report of the central team visiting the area. However, this meant procedural delays and there have been occasions when the recommendations or the report have not been considered or been modified, while awarding relief.

The Eleventh Finance Commission was critical of the management of the NFCR during 1995-00 and highlighted issues related to the process and time of defining the calamity. The second important aspect was the viability of the Fund itself. While the NFCR was supposed to build up a corpus (Rs. 7,000 million) over 1995-00, the entire corpus is reported to have been exhausted in the first three years itself<sup>3</sup>. The EFC recommended that the NFCR be discontinued in its existing format, as it would only lead to more and more representations from the states and the procedural delays and non-conformity to norms rendered it counter-productive.

For calamities of rare severity, the EFC put forward the following:

1. The setting-up of a National Centre for Calamity Management within the MoA to monitor occurrences of calamities and damages on a regular basis. The Centre would also assess whether the state government will be in a position to provide relief and then make a recommendation to the Centre on the severity of the event and possible assistance from Centre or other states.
2. Any assistance from the Centre should be financed by special levy of a special surcharge for a limited period. The collection of such a surcharge is to be kept in a fund known as the National Calamity Contingency Fund (NCCF) kept in the public account of the GoI, towards which the Centre would contribute a corpus of Rs. 5,000 million. Any drawals from this fund would need to be accompanied by immediate levy of special surcharge to ensure speedy recoupal of the amount and sustainability of the fund.
3. The NCCM should also carry out appropriate studies on recurrence of various types of calamities to prepare medium and long term mitigation strategies, which might be considered by the Planning Commission. The Centre should also take up training of state cadres and also undertake documentation and evaluation works.

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<sup>2</sup> The NCRC was chaired by the Union Minister of Agriculture and have members including selected state Chief Ministers and the Chairman, Planning Commission. The TFC advised that representation of the centre and the states should be ensured in the committee.

<sup>3</sup> There were as many as 70 memoranda received by the centre from 23 states during 1995-98, seeking total assistance of Rs. 240,000 million from the NFCR, while the corpus for five years was only Rs. 7,000 million !

The NCCF was constituted in 2000, with a corpus of Rs. 5,000 million. The High Level Committee comprising of the Minister for Finance, Minister for Agriculture and the Deputy Chairman of the Planning Commission met on January 20, 2001 and approved total assistance amounting to about Rs. 4,342 million from the NCCF for release to eleven states during the current financial year. A note on financing arrangement for relief and the changes over time is provided in the Annexure E.

### **Monitoring the progress of relief measures**

An Expert Group has been constituted on the recommendations of the Ninth Finance Commission to monitor the relief work done, utilising the CRF. Further, the State Level Committee(s) are to keep the Ministry of Agriculture informed of the amount of damage caused due to drought, floods etc. as well as the broad details of relief measures undertaken by them. The Scarcity Relief Division, in the Department of Agriculture & Cooperation, the requested the State Governments to furnish the progress of relief measures in the prescribed proforma on quarterly basis.

### **State Relief Organisation and Response**

The state has a Relief Commissioner who is in charge of the relief measures in the wake of natural calamities in the state. The Relief Commissioner maintains a Hot line for communication with the district administration and makes use of the NIC link for updation of information from the districts. In addition, there is also the provision for video-conferencing between the state capital and the district HQ officials.

### **State Crisis Management Group**

A State Crisis Management Group (SCMG) or similar high-level group is formed under the Chairmanship of the Relief Commissioner. This Group will comprise of Senior Officers from the Departments of Revenue, Relief, Home, Civil Supplies, Power, Irrigation, Water Supply, Panchayat Raj & Rural Development, Agriculture, Forests, Health, Finance and Planning. The Chief Secretary/Relief Commissioner may also co-opt on the Group, depending upon the requirements of the situation, one or more of the following persons:

1. Sub Area Commander/Section Commander
2. Station Commander of Air Force
3. Flag Officer Command-in-Chief
4. Chairman/Secretary, Indian Red Cross, State Branch
5. Representative of Meteorological Department Officer-in-charge, Cyclone Warning Centre, CWC and Flood Forecasting Organisations.
6. General Manager, Railways of the zone concerned.
7. General Manager, Telephones
8. Chief General Manager, Telecommunications
9. D.G. of State Police
10. Chief Engineer, Roads & Buildings
11. Chief Engineer, Major irrigation
12. Chief Engineer, PRED-RWS
13. Chief Engineer, Department of PH
14. Director of Agriculture
15. Director of Horticulture

16. Director of Medical Health Services
17. Director of Animal Husbandry
18. Secretary of the State Electricity Board
19. Secretary, Deptt. of Women & Child Development.
20. Station Director AIR/DDK
21. Director, Civil Supplies
22. Regional Manager, Indian Oil Corporation

### **SCMG Responsibilities**

The SCMG will, take into consideration the instructions and guidance received, from time to time, from the Government of India and formulate action plans for dealing with different natural calamities. The SCMG will also have the district level plans for relief formulated by the District Collectors.

### **State Level Control Room**

The Relief Commissioner of the State shall establish a Emergency Operation Centre (Control Room) as soon as a disaster situation develops. The Control Room shall have all information relating to the forecasting and warning of disaster, action plans for implementation and details of contact points and various concerned agencies. It shall have updated information about the Air Force, the Navy and the Army for quick interaction in times of crisis.

### **State level control room responsibilities**

The Control Room will be responsible for:

1. Transmitting to the Central Relief Commissioner information as to the development of a crisis situation as a result of natural disaster on continue basis till the situation improves;
2. Receiving instructions and communicating to the appropriate agencies at local level, for immediate action;
3. Collection and submission of information relating to implementation of relief measures to the Central Relief Commissioner; and
4. Keeping the State level authorities appraised of the developments on a continuing basis.

The District collector will be the focal point at the district level for preparation of the district level plans and for directing, supervising and monitoring relief measures for natural calamities.

### **Contingency Plans**

While the national Policy mandates the drawing up of a contingency plan for the district for different disasters by the Collector/Deputy Commissioner and got approved by the State Government, this system is not fully developed in the state. The State government has developed a draft Manual for Disaster Mitigation which outlines the key points to be covered by the District authorities in times of a crisis.

## **District Relief Committee**

The relief measures shall be reviewed by the district level Relief committee consisting of official and non-official members including the local legislators and the members of Parliament

## **District Control Room**

In the wake of natural calamities a Control Room shall be set up in the district for day to day monitoring of the rescue and relief operations on a continuing basis. This usually functions from the District Collectorate.

## **Coordination**

The Collector shall maintain Close liaison with the Central Government authorities in the districts, namely Army, Air Force and Navy, Ministry of Water Resources etc., who could supplement the effort of the district administration in the rescue and relief operations.

The Collector/Deputy Commissioner shall take all steps for enlistment of voluntary efforts and channelising the non-Government organisations response to natural calamities.

The Collector shall closely interact with different implementation agencies and furnish information on a daily basis to the State Relief Commissioner on the implementation of rescue and relief measures.

**ANNEXURE D**

<b>MINISTRIES/DEPARTMENTS RESPONSIBLE FOR RELIEF FUNCTIONS</b>							
SI No	Relief Functions (Primary and Secondary)	<b>DISASTERS</b>					Ministries/Departments Responsible for Relief Functions
		Earthquake	Cyclone	Flood	Fire/Avalanche/Landslides	Drought/Famine	
<b>PRIMARY</b>							
1	Forecasting and operation of warning systems	X	X	X		X	IMD/CWC
2	Provision of communication	X		X	X	X	DOT
3	Wide publicity to disaster preparedness through AIR/TV	X	X	X	X	X	MIB
4	Transport with particular reference to movement of essential commodities and petroleum products	X	X	X	X	X	DOS/MOR/MOP
5	Ensuring availability of essential commodities for price control (including inputs)	X	X	X	X	X	DAC/DCS/DOE/ MOP/MOC
6	Ensuring availability of medicines, drugs and vaccine (including first aid)	X	X	X	X	X	MHFW
7	Preservation and restoration of physical communication links	X	X	X	X		MOR/DOT/ DOST/MUD
8	Investment of infrastructure	X	X	X	X		DAC/MWR/DOP/ MOR/MOP/PC/MEF/

MINISTRIES/DEPARTMENTS RESPONSIBLE FOR RELIEF FUNCTIONS							
Sl No	Relief Functions (Primary and Secondary)	DISASTERS					Ministries/Departments Responsible for Relief Functions
		Earthquake	Cyclone	Flood	Fire/Avalanche/Landslides	Drought/Famine	
9	Mobilisation of resources	X	X	X		X	MOF
10	Flow of credit	X	X	X	X	X	MOF/DAC
SECONDARY							
1	Flood/inflow forecasts			X		X	CWC/MWR
2	Rescue/evacuation operation	X	X	X	X		MOD/MHA/MHFW
3	Relief/Rehabilitation/Restoration	X	X	X	X	X	DOW/DAC/DID/MOT /MEF
4	Contingency plans for crops/cattle		X	X		X	DAC/DOE/DCP/MEF
5	Contingency plans for health measures and nutrition	X	X	X	X	X	MHF/DWOD
6	Technical & Technological inputs for provision of drinking water	X	X	X		X	DRD/MUD
7	Technical assistance in the water budgeting and water management for various uses			X		X	MWR/MUD/DRD
8	Coordination of the activities of the State and voluntary agencies	X	X	X	X	X	DRD/DAC
9	Disaster preparedness of areas	X	X	X	X	X	All from 1 to 29
Source: Ministry of Agriculture, (10), 2000							



## ANNEXURE E

### Calamity Relief – Financial Mechanisms in India

The present scheme of financing the relief expenditure arising out of natural calamities has come into force (April 01, 1990), consequent upon the acceptance of the recommendations of the Ninth Finance Commission (NFC). Under this scheme, a Calamity Relief Fund<sup>4</sup> (CRF) is constituted for each State with the Central Government contributing 75 percent in four quarterly installments and the balance 25 percent provided by the State Governments from its own resources. Following the constitution of the CRF, it is the responsibility of the State Government to meet all expenditure arising out of the natural calamities. The NFC also directed that the fund be maintained as a separate account in a nationalised bank, outside the general revenues and Public Account of the state and be administered by a committee headed by the Chief Secretary of the state. The Ministry of Finance (MoF) laid down elaborate guidelines of investment to be made from the CRF to ensure augmentation and liquidity. These were subsequently modified at the directions of the TFC. However, the Comptroller & Auditor General (CAG) had reported to the Eleventh Finance Commission (EFC) that most of the states do not follow the prescribed investment norms and often use these funds for managing the ways and means expenditure. The EFC reiterated the placement of this fund outside the Public Account and the investment pattern suggested by the MoF, as the resources were only supposed to meet unforeseen emergencies.

As per the recommendations of the TDC, an Expert Committee prepared (1995) a list of items eligible for expenditure under the CRF. While the states have asked for modifications to the list, the EFC has maintained that adherence to this list is essential provided that the list incorporates local needs and requirements. The norms for expenditure on each approved item is fixed by the State Level Committee, which informs the MoA. The EFC also stressed that any excess expenditure incurred is to be borne from the normal budget of the state government. The EFC had also clarified that medium and long term strategies for disaster mitigation need to be funded by the Plan and restoration of works of capital nature damaged during a natural calamity should be borne by the CRF only for providing immediate relief to the affected population and should be of short duration. The EFC also recommended that the Centre's share of the CRF be released on May 01 and November 01 of each year in two installments upon receiving concurrence from the state government on two counts – credit of earlier installment into the CRF account and updated expenditure and balance statement – for lessening delays and making transfers systematic.

The Tenth Finance Commission (TFC) recommended the constitution of a separate central fund – the National Fund for Calamity Relief (NFCR) – under the Ministry of Agriculture, to provide assistance to states affected by natural calamity of rare severity. The TFC fixed the size of the fund at Rs. 7,000 million, to be built up over the period of 1995-00, to which the centre and states would contribute in the ratio 75:25. The TFC did not fix any criteria or

<sup>4</sup> The size of the Fund for each state was determined by considering the average of actual ceiling of expenditure approved for a state over the 1979-89 period. The total amount worked out for all the states amounted to Rs. 8,040 million annually during the 1990-95 period. The Tenth Finance Commission re-worked this amount taking into account the average of aggregate of ceilings of expenditure for the years 1984-89 and the CRF for 1990-93, adjusted for inflation. The amount thus worked out for all the states for the 1995-00 period was Rs. 63,043 million.

problem, it suggested that the decision be made on a case-to-case basis. The NFCR was to be managed by a National Calamity Relief Committee<sup>5</sup> (NCRC). The guidelines issued by the MoF empowered the NCRC to decide on the severity of the calamity based on recommendations of an Inter-Ministerial Group (IMG) which is informed by the report of the central team visiting the area. However, this meant procedural delays and there have been occasions when the recommendations or the report have not been considered or been modified, while awarding relief.

The EFC was critical of the management of the NFCR during 1995-00 and highlighted issues related to the above mentioned process and time of defining the calamity. The second important aspect was the viability of the Fund itself. While the NFCR was supposed to build up a corpus (Rs. 7,000 million) over 1995-00, the entire corpus is reported to have been exhausted in the first three years itself<sup>6</sup>. The EFC recommended that the NFCR be discontinued in its existing format, as it would only lead to more and more representations from the states and the procedural delays and non-conformity to norms rendered it counter-productive.

For calamities of rare severity, the EFC put forward the following:

1. The setting-up of a National Centre for Calamity Management within the MoA to monitor occurrences of calamities and damages on a regular basis. The Centre would also assess whether the state government will be in a position to provide relief and then make a recommendation to the Centre on the severity of the event and possible assistance from Centre or other states.
2. Any assistance from the Centre should be financed by special levy of a special surcharge for a limited period. The collection of such a surcharge is to be kept in a fund known as the National Calamity Contingency Fund (NCCF) kept in the public account of the GoI, towards which the Centre would contribute a corpus of Rs. 5,000 million. Any drawals from this fund would need to be accompanied by immediate levy of special surcharge to ensure speedy recoupal of the amount and sustainability of the fund.
3. The NCCM should also carry out appropriate studies on recurrence of various types of calamities to prepare medium and long term mitigation strategies, which might be considered by the Planning Commission. The Centre should also take up training of state cadres and also undertake documentation and evaluation works.

In light of the recommendations, the NFCR has been discontinued and the corpus for the NCCF was raised towards the end of 2000. As of January 20, 2001, about 88 percent of the corpus was disbursed to 11 states. The National Centre is not in operation as of now.

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<sup>5</sup> The NCRC was chaired by the Union Minister of Agriculture and have members including selected state Chief Ministers and the Chairman, Planning Commission. The TFC advised that representation of the centre and the states should be ensured in the committee.

<sup>6</sup> There were as many as 70 memoranda received by the centre from 23 states during 1995-98, seeking total assistance of Rs. 240,000 million from the NFCR, while the corpus for five years was only Rs. 7,000 million !

STATEMENT OF ALLOCATION TO STATES FROM THE NCCF, JANUARY 2001			
Sl No	Name of State	Calamity	From NCCF(in Rupees crore)
1.	Andhra Pradesh	Rains/floods	10.00
2.	Arunachal Pradesh	Flash floods	2.00
3.	Bihar	Rains/floods	29.67
4.	Chhattisgarh	Drought	40.00
5.	Gujarat	Drought	85.00
6.	Himachal Pradesh	Flash floods	8.29
7.	Madhya Pradesh	Drought	35.00
8.	Meghalaya	Cyclonic winds	1.00
9.	Orissa	Drought	35.00
10.	Rajasthan	Drought	85.00
11.	West Bengal	Rains/floods	103.25
		<b>TOTAL:</b>	<b>434.21</b>

## STATEMENT OF CRF ALLOCATIONS FOR STATES

Calamity Relief Fund during 2000-2005 (in Rs. Lakhs)							
(Total with Centre and State share in the ratio 3:1)							
Sl No	STATE	2000-01	2001-02	2002-03	2003-04	2004-05	TOTAL
							2000-05
1	Andhra Pradesh	19,806	20,796	21,836	22,928	24,074	109,440
2	Arunachal Pradesh	1,202	1,262	1,325	1,392	1,461	6,643
3	Assam	10,149	10,657	11,189	11,749	12,336	56,081
4	Bihar	12,366	12,984	13,633	14,315	15,030	68,328
5	Goa	124	130	137	144	151	685
6	Gujarat	16,140	16,947	17,794	18,684	19,618	89,184
7	Haryana	8,130	8,537	8,964	9,412	9,883	44,926
8	Himachal Pradesh	4,349	4,566	4,794	5,034	5,286	24,029
9	Jammu & Kashmir	3,490	3,665	3,848	4,040	4,242	19,285
10	Karnataka	7,457	7,830	8,221	8,632	9,064	41,204
11	Kerala	6,724	7,061	7,414	7,784	8,173	37,156
12	Madhya Pradesh	9,010	9,461	9,934	10,430	10,952	49,786
13	Maharashtra	15,720	16,506	17,332	18,198	19,108	86,864
14	Manipur	287	301	316	332	349	1,586
15	Meghalaya	394	414	434	456	479	2,177
16	Mizoram	297	312	328	344	361	1,642
17	Nagaland	196	206	216	227	238	1,083
18	Orissa	10,947	11,494	12,069	12,672	13,306	60,488
19	Punjab	12,272	12,885	13,530	14,206	14,917	67,810
20	Rajasthan	20,700	21,735	22,822	23,963	25,161	114,381
21	Sikkim	691	725	762	800	840	3,817
22	Tamil Nadu	10,264	10,777	11,316	11,882	12,476	56,714
23	Tripura	520	546	573	602	632	2,873
24	Uttar Pradesh	17,864	18,757	19,695	20,680	21,714	98,711
25	West Bengal	10,110	10,616	11,147	11,704	12,289	55,866
	<b>Total</b>	<b>199,210</b>	<b>209,170</b>	<b>219,629</b>	<b>230,610</b>	<b>242,141</b>	<b>1,100,759</b>

Source: Ministry of Agriculture, GoI, 2001

**STATEMENT OF RELEASES FROM NATIONAL FUND FOR CALAMITY RELIEF 1995-96 TO  
1999-2000 (In Rs. Crores)**

Sl No	State Name	Year					Total
		1995-96	1996-97	1997-98	1998-99	1999-2000	
1	Andra Pradesh	0	163	42	26.5	75.36	306.86
2	Arunachal Pradesh	0	13	0	13.47	0	26.47
3	Assam	0	21	0	59.9	0	80.9
4	Bihar	0	28	10	11.45	38.18	87.63
5	Gujarat	0	0	86.9	55.35	54.58	196.83
6	Haryana	39.41	0	0	13.27	0	52.68
7	Himachal Pradesh	12.49	10.56	24.8	0	0	47.85
8	Jammu & Kashmir	18.17	0	0	0	73.42	91.59
9	Karnataka	0	0	22	49.98	17.09	89.07
10	Kerala	0	0	12.91	0	0	12.91
11	Madhya Pradesh	0	0	67.76	35	38.86	141.62
12	Meghalaya	0	10	0	0	0	10
13	Mizoram	4.71	0	0	0	6	10.71
14	Orissa	25.75	55	4	0	828.15	912.9
15	Punjab	16.16	0	0	0	0	16.16
16	Rajasthan	0	21	0	21.98	102.93	145.91
17	Sikkim	0	5.52	7	7.67	0	20.19
18	Tamil Nadu	0	25	0	0	0	25
19	Tripura	0	0	0	5.05	5.34	10.39
20	Uttar Pradesh	0	0	0	131.15	16.68	147.83
21	West Bengal	0	21	0	66.33	29.52	116.85
22	Manipur	0	0	0	0	4.93	4.93
	<b>Total</b>	<b>116.69</b>	<b>373.08</b>	<b>277.37</b>	<b>497.1</b>	<b>1291.04</b>	<b>2555.28</b>

Source: Ministry of Agriculture, Gol, 2001

## ANNEXURE F

### Piloting Local Water Resource Management

The main impacts of the droughts are:

- 1) Water scarcity
  - a) For agriculture
  - b) For drinking water
- 2) Food shortage
  - a) Due to failure of Kharif crops
  - b) Due to reduced Rabi crops area arising from water shortage
- 3) Seasonal migration
  - a) Due to food shortage/ low labour demand

The causative factors of droughts may be summarized as follows:

- 1) Lower than normal rainfall
- 2) Water intensive cropping patterns based on normal rainfall
- 3) Over extraction of ground water and Low ground water stock even during normal rainfall years.

While rainfall variability is not controllable, the other two main parameters can be changed to a large extent. These parameters are driven by aspirations and also by technologies available with farmers. While ground water is largely invisible resource, and users have very little information available to manage ground water. These factors can be changed only at decentralized levels (village/ hamlet) since decisions are taken at those levels.

The current drought management and mitigation paradigms are based on state interventions. Unfortunately, these are not linked with ground level realities. Following main issues need to be noted in the context of Andhra Pradesh:

- 1) Largely fragmented land ownership pattern leading to decisions on water use lying with multiple users, thereby defying possibilities of unified control over water use.
- 2) Survival/ subsistence based agriculture; Low surplus in agriculture preventing investments on water conservation
- 3) Shifting away from less water demanding/labor demanding cropping patterns due to economic reasons( eg. millets to paddy, sugar cane, cash crops)
- 4) Lack of economically attractive, off- the-shelf low water demanding crop options.
- 5) High pressure on water resources due to the above reasons.
- 6) Continued investments on extractive technologies without adequate investments on water saving technologies.
- 7) State policies aimed at subsidization and equalization of input costs between irrigated and unirrigated regions (eg. Power subsidies to farmers).
- 8) Inability of the state to control over use of water

While some of the issues can only be addressed at state level, significant proportion of the issues require management of natural resources at local levels. Efforts in this direction are conspicuous by their absence, so far. Pilot projects on sustainable water resource

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resource management issues on ground level. Components of an indicative pilot programme for drought mitigation at village level need to include.

- 1) Developing a village/ settlement level water balance model including surface and ground water and exploring possibility of developing water resources,
- 2) Understand dynamics of private & public investments and their impacts on short/long term water availability and usage patterns,
- 3) Simplifying these models and lessons to inform village communities,
- 4) Develop simple instruction/simulation tools/ games for generating awareness among different users about ground water and surface water resource dynamics.
- 5) Using the models to generate awareness about water resources and developing a participative water resource monitoring system,
- 6) Develop skills to monitor and assess water resources at village/ settlement levels,
- 7) Developing a village level water resource control/ management team represented by community,
- 8) Enabling these groups to develop rules for water use and conservation, with technical support,
- 9) Develop set of appropriate, less water intensive crop options suitable for different land types.
- 10) Developing a consensus regarding water use among different users,
- 11) Encourage development of water resources and conservation at farm and village level and reduce wastages,
- 12) Develop incentives/ disincentives to adopt conservation technologies.

This pilot programme can be integrated with watershed development. This would need sustained technical and social development, and conflict resolution inputs from NGO/Government/ interdisciplinary teams.

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