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Assessment of Recent Droughts in Tamil Nadu

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Tamil Nadu, a coastal state in south India, is prone to droughts. The climate of the state ranges from dry subhumid to semiarid. The state has three distinct rainfall climates: (1) advancing monsoon period (from June to September), with strong southwest winds; (2) northeast monsoon (from October to December), with dominant northeast winds; and (3) dry season (from January to May). The normal annual rainfall of the state is about 945 mm.

Tamil Nadu is classified into seven agroclimatic zones: northeast, northwest, west, southern, high rainfall, high altitude hilly, and Cauvery Delta (the most fertile agricultural zone). The Cauvery Delta zone, located in the humid tropics, has a mean annual rainfall of 1,273 mm, with more than 60% of that coming from the northeast monsoon. An analysis of summer monsoon rainfall (June–September) for 1871–1991 shows that the state experienced below-normal rainfall in 30% of these years. During the summer, the average rainfall is 266 mm, but water demand is 663 mm. Hence it is a deficit season. The northeast monsoon brings an average of 529 mm rainfall and demand is relatively low—361 mm.

Table 1 gives the climatic moisture status of different stations in Tamil Nadu in winter (I) and summer (II). It clearly shows that water deficit is more common in summer. This gap can only be bridged by irrigation. However, during the winter monsoon (northeast monsoon), soil moisture is recharged. Hence, the cropping system is centered on the northeast monsoon period.

Drought is more recurrent during June–September. Its severity and extent during this season is believed to be more dependent on rainfall aberrations, ground water level, reservoir level, crop conditions, and soil type. The state has predominantly red, black, and alluvial soil types. Sandy soil regions of southeast Tamil Nadu suffer from chronic droughts. Tamil Nadu farmers, with a long history of experiences with natural disasters like droughts, have adjusted to the phenomenon through trial and error. Occasionally they have adopted sericulture, as is being done in the agroclimatic west zone of the state. However, modern agriculture requires effective cropping patterns suited to the rainfall distribution or probability of drought recurrence. Hence, assessment of past droughts (both qualitative and quantitative) and their impacts on the socioeconomic status of the state are necessary and may help policy makers and others in determining new courses of action.

An assessment of droughts in Tamil Nadu from 1977 to 1991 reveals recurrent drinking water shortages in major parts of the state—the city of Madras in particular. The worst drought years in the past 15 years are identified as 1980, 1982, 1983, 1987, and 1989. The 1987 drought, which has crippled the state's economy, is assessed and discussed here. Table 2 gives an account of expenditures on drought management and drought combined with flood. In 1983–84, the state incurred expenditures of 106.2 Crores because both floods and droughts were severe.

Station		Seasonal PET, mm	Seasonal rainfall mm	Soil moisture use, mm	Water deficit mm
Vollore	I	690	634	3	137
	II	788	340	369	171
Salem	I	644	621	71	0
	II	892	217	550	73
Coimbatore	I	642	297	335	0
	II	801	248	511	61
Tiruchirapalli	I	992	448	580	0
	II	858	331	500	73
Madurai	I	708	475	285	4
	II	794	344	402	100
Pamban	I	767	225	607	0
	II	854	671	391	73
Palainkottai	I	845	210	675	0
	II	829	489	369	7

Table 1. Seasonal climatic moisture status of Tamil Nadu.

The drought of 1980 destroyed the groundnut crop over one lakh (100,000) hectares in the districts of Chingleput and North Arcot. As a result of the failure of the northeast monsoon in 1980, drought prevailed in 3–4 districts in early 1981, resulting in the destruction of mangoes and coconuts.

The 1982 drought caused huge losses in paddy and groundnut crops as well as drinking water shortages. Even the moisture-surplus regions of the state, like the Nilgiri hills, suffered from severe drought, resulting in the destruction of more than 6,000 hectares of tea plantation. The state also lost more than one lakh hectares of paddy, millets, and pulses during the 1983 drought. Hydropower generation failed because of very low water in the Mettur reservoir. The drought of 1987 put the entire state (as well as the country) in the doldrums. About 6,000 villages, 3 lakh hectares of crops, and 108 lakh cattle were affected. The 1987 drought serves as a model chronic drought year in Tamil Nadu, and it is interesting to study its redeeming features and its management. The catchment areas did not receive any water, and there were 290 poor rainy days, 48 marginal rainy days, and 27 good rainy days. The ground water level fell steeply, up to 11 meters. This was partly due to overexploitation of ground water and partly to a lack of legislation to curb this activity until the 1987 drought, when the state government passed the Madras Metropolitan Area Ground Water (Regulations) Act.

The hardest hit crops were paddy, millets, and pulses. Out of 24 lakh hectares, paddy could be sown on only 20 lakh hectares, resulting in a yield of 56 lakh tons compared to a target of 66 lakh tons. Similarly, production of millets was only 16 lakh tons (compared to a target of 20 lakhs) and pulse production was 4.27 lakh tons (compared to a target of 4.75 lakh). As a part of contingency crop planning, seeds, fertilizers, and pesticides worth Rs. 45 lakhs were distributed to 2 lakh farmers (both small and marginal). Because of poor storage in the reservoirs, the cropping pattern was changed. A unique plan of "direct sowing" was advocated in particular to the farmers of Cauvery Delta of the Tanjur district. The strategy was to raise a rainfed crop, and when the reservoir level in the Mettur dam improved, the water would be released to supplement the rainfall. A large number of farmers had to be convinced to

Year	Amount (Rs. in Crores)
1966–67*	2.739
1968–69	2.450
1969–70	17.408
1972–73*	7.809
1973–74	8.261
1974–75	21.420
1975–76	33.760
1976–77*	33.510
1981–82	61.810
1982–83	17.080
1983–84*	106.210
1986–87	30.910
1987–88	77.150

*** denotes both drought and flood**

Table 2. Expenditures on drought management and droughts and floods in Tamil Nadu.

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adopt this strategy; as a result, 49-50% of the area was brought under paddy and the production level was sustained.

Good employment opportunities were created during the drought. The agrarian labor force, which forms about 30% of the total work force in the state (higher than the all-India average of 23%), was employed to strengthen bunds of irrigation tanks and channels, perform desilting work, construct percolation ponds, carry out moisture conservation work, and so forth. This helped in drought proofing, capturing rainwater during monsoons, and recharging the ground water potential.

Major programs by the state forest department included water facilities for wildlife, afforestation work, construction of open and bore wells, and so forth. Other projects included the establishment of 19 ecological farms in all districts and training farmers in the central districts to enable them to gain employment in fisheries. The sale of paddy straw was given full subsidy so that "distress sales" of cattle could be avoided. The administration was able to avoid cattle migration and cattle camps.

During droughts, the state government adopted novel approaches such as the creation of commercially useful plantations, fish farming, and ecological farming to ensure full benefit to the poor and needy. The interaction of the public and authorities during droughts is quite encouraging. At times the people themselves identified priorities for investment and work; achieving these priorities depends on the ability of the government, through a strong extension component, to convince the farming community to agree to changes with "farmer friendly" packages.