

## 1.1. Introduction

Agriculture plays a key role in the development of any economy. It contributes significantly to the process by supply of raw materials to manufacture, wage goods to workers in other sectors, employment to the work force, investible surplus and markets of products of industry<sup>1</sup>.

Agriculture provides basic sustenance to all living beings. It is very important that ecologically, socially and economically sustainable agriculture should become the backbone of the development process of the State. Agriculture should be sustainable so that the natural resources such as soil, water and biodiversity are used efficiently and equitably. It should be economically viable and lead to increasing employment opportunity, socially feasible, strengthening the role of women and other marginalized sections of the people. Equity in sharing benefits is vital for community participation in the conservation and enhancement of natural resources. Agriculture continues to be the prime mover of the State economy supporting 62 percent of the population and contributing 13 percent of the State income as of 2004-05<sup>1</sup>.

The Government is aiming to achieve 100% food security in the State and also to create avenue for export of agricultural produce for economic upliftment of the farming community. During the Tenth Plan period, the State is aiming an annual growth rate of 4% in agriculture and 8% in horticulture crops for sustainable agricultural development, employment generation and poverty alleviation. The Government is focusing its policies towards overall development of agriculture sector in terms of increasing the cropping intensity by bringing every piece of land under cultivation, productivity increase, maximizing natural resources with parallel efforts to conserve them<sup>1</sup>.

## 1.2. Land Use Pattern

Land use pattern of the State has undergone rapid structural changes over the period. The net area sown which stood at 62.59 lakh ha. accounting for about 42.8 percent of geographical area during 1979-80, witnessed a decline to 42.78 percent in 1999-2000 and further to 37.05 percent in 2003-04 (Table 1.1). The decline in the net area sown was mainly attributed to increasing conversion of agricultural land into nonagricultural purposes including housing sites. The full impact of the above observations is that rising population, consequent urbanisation, rural-to-urban induced migration, falling net area sown, creation of substantial rural employment, indiscriminate housing activities, etc. are major areas of concern. Area under permanent pastures and grazing lands are shrinking; it is a sign of a decline in village common land due to encroachment and neglect. However total area under these categories is very small. The area under miscellaneous tree crops and groves has increased which is a sign of growing interest in agro-forestry and horticultural trees<sup>2</sup>.

**Table 1.1. Land use pattern**

Classification	Average area T.E. 1979-80 (ha)	Average area T.E. 1999-00 (ha)	Average area T.E. 2003-04 (ha)
Forests	2025	2138	2129
Barren and unculturable land	610	478	488
Land put to non-agricultural uses	1682	1966	2041
Culturable waste	351	347	385
Permanent pastures and other grazing lands	165	123	117
Land under miscellaneous tree crops and groves not included in the net area sown	195	238	277
Current fallows	1257	1008	1161
Other fallows lands	456	1137	1588
Net area sown	6259	5560	4817
<b>Total Geographical area</b>	<b>13001</b>	<b>12995</b>	<b>13003</b>

## 1.3 Waste Land

A recent estimate shows that in 20 districts of Tamil Nadu, there is waste land to the extent of 36.28 lakh ha. Special schemes have been drawn to put these lands to productive use by suitable reclamation of land and cultivation of select crops, with the technical and financial support of the Government of Tamil Nadu. If the landless agricultural labours are the target beneficiaries of the scheme, it will generate employment opportunities to at least 20 lakh farm workers. Mobilisation of required resources and economically viable operational strategy will make the scheme a success. Emphasis must be on participatory development through collective community based efforts, because individual tiny farms are economically not viable on such marginal and sub-marginal lands<sup>1</sup>.

**Table : 1.2. District wise waste land in Tamil Nadu**

S.No.	District	Waste Land (ha)
1.	Kancheepuram	183
2.	Cuddalore	276
3.	Vellore	149
4.	Thiruvannamalai	141
5.	Salem	262
6.	Dharmapuri	195
7.	Coimbatore	182
8.	Erode	180
9.	Thiruchirapalli	391
10.	Pudukottai	137
11.	Thanjavur	139
12.	Madurai	177
13.	Dindigal	209
14.	Ramanathapuram	144
15.	Virudhunagar	141
16.	Sivaganga	177
17.	Tirunelveli	284
18.	Thoothukkudi	180
19.	Nilgiris	47
20.	Kanyakumari	34

Source: perspective plan for waste land development, TNAU, Coimbatore, 2001

## 1.4 Irrigation

The net area sown in Tamil Nadu is about 60 lakh hectares of which about 30 lakh hectares or 50% get irrigation facilities from sources as given below: -

1. Canals.. 9.50 lakh hectares
2. Tanks.. 9.00 lakh hectares
3. Wells, Tube wells.. 11.50 lakh hectares

The crop production in Tamil Nadu is limited by the decline in net area sown, cropping intensity and area of crops irrigated. Therefore any further development would require attention to improvement in productivity of crops in both irrigated and unirrigated areas and farm technology has to help this improvement in yield of crops. A change in crop pattern favouring high value adding crops is a strategy to increase farm income<sup>1</sup>.

## 1.5. Soils

In Tamil Nadu 94 soil families were identified and classified according to soil taxonomy into six orders. Among the six orders inceptisol formed 50% of the total geographical area followed by alfisols (30%). Soil depth is not a limiting factor for crop growth in Tamil Nadu except shallow soils which occur in 14 percent of the total geographical area of the State. The texture of surface soil of the State shows that 18 percent area has sandy surface soil, 53 percent has loamy surface soils and 22 percent has clayey surface soil<sup>5</sup>.

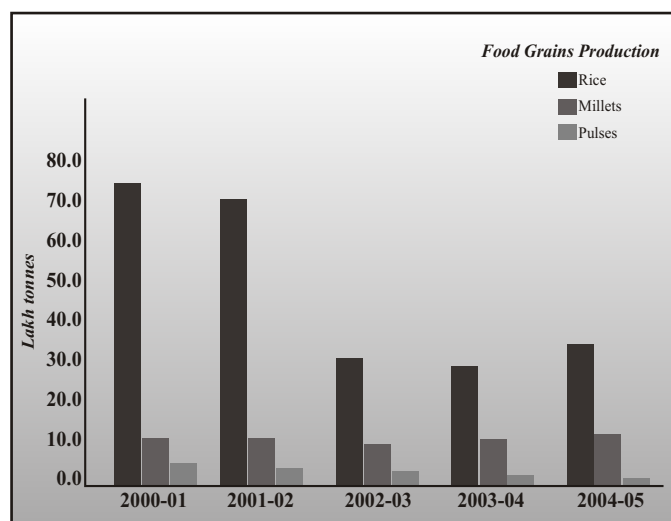
## 1.6. Principal crops and productions

Rice is the dominant crop in Tamil Nadu. Groundnut, Sugarcane and cotton are important commercial crops. Jowar, bajra and pulses are some important foodgrain crops. These seven crops account for about 73% of gross cropped area, while 42 other crops are each cultivated in small areas. They include minor millets, other oil seeds, turmeric, vegetables, fruits, coconut and other minor crops<sup>1</sup>.

In Tamil Nadu these seven crops determine the overall growth of value added in agriculture and they are studied in detail. However some of the crops included in 'other crops' have the prospect of coming to prominence by their potential contribution to exports. Turmeric, tropical fruits, flowers, indigo, palmarosa, medicinal plants, spices particularly onion, pepper and cardamom are gaining attention of farmers.

The economics and statistics report figure shows that area under paddy increased to 19.09 lakh ha. during 2004-05 compared to 13.97 lakh ha. in the preceding year. Area under millets and pulses also registered increases. Total area under food grains rose to 34.55 lakh ha. against 28.37 lakh ha. during 2003-04. Appreciable increase in area is also noticed in respect of oilseeds and cotton during 2004-05. In respect of cotton, increases in the area could be partly attributed to extension efforts backed with supply of quality inputs. Farmers were motivated to go in for short duration varieties

which is remunerative alternative crop for rice fallow pulses. To encourage cotton growers in Tamil Nadu, contract farming is popularized with buy back arrangements. Under contract farming, the farmer is provided support in diverse areas such as marketing, input, credit, insurance coverage etc<sup>5</sup>.



**Fig.1.1. Principal crops of Tamil Nadu**

**Table. 1.3. Area, Production and yield rate of Principal crops**

Crops	Area (Lakh ha.)			Production (Lakh tonnes)			Yield Rate (Kgs./ha)		
	2002-03	2003-04	2004-05 (FFE)	2002-03	2003-04	2004-05 (FFE)	2002-03	2003-04	2004-05 (FFE)
<b>Paddy</b>	15.17	13.97	19.09	35.77	32.23	53.02	2359	2308	2777
<b>Millets</b>	7.12	9.03	9.70	6.83	8.88	11.35	958	983	1170
<b>Pulses</b>	5.63	5.37	5.76	2.00	2.01	2.29	356	375	397
<b>Food grains</b>	27.92	28.37	34.55	44.60	43.12	66.66	1598	1520	1929
<b>Oilseeds*</b>	5.92	6.95	8.22	7.60	9.64	13.20	1284	1387	1606
<b>Cotton@</b>	0.76	0.98	1.43	0.84	1.23	2.18	188	213	259
<b>Sugarcane\$</b>	2.61	1.92	2.32	24.17	17.66	23.40	9244	9192	10086

\* - includes groundnut, gingelly, castor and sunflower @ - in lakh bales of 170 kgs. of lint each;

\$ - in terms of gur FFE-Final Forecast Estimate of Analysis Tamil Nadu - Quarter ending 2005-06

Source : 1. Directorate of Economics and Statistics, Chennai-6.

## 1.7 Productivity of Crops

Total paddy production rose to 53.02 lakh tonnes during 2004-05, up from 32.23 lakh tones in 2003-04 and 35.77 lakh tonnes in 2002-03. About three-fourth of the total food grains production was contributed by paddy. Oilseed production was estimated at 13.20 lakh tonnes, improving from 9.64 lakh tonnes in 2003-04. Similarly, sugarcane production was estimated to increase to 23.40 lakh tonnes against 17.66 lakh tonnes in the preceding year. Improvement in the productivity of crops played major role in enhancing the production during the year. Yield rate of paddy rose from 2308 kg. / ha. in 2003-04 to 2777 kg / ha. in 2004-05. In respect of millets per hectare yield rose from 983 to 1170 kgs. and for pulses the increase was from 375 to 397 kgs<sup>5</sup>.

## 1.8 Critical Inputs

### 1.8.1 Chemical Fertilizer

The fertilizer consumption (NPK) had gradually declined from 9.38 lakh tonnes in 2001-02 to 7.43 in 2002-03, 7.13 lakh tonnes in 2003-04 but there was increase in consumption in 2004-05 to 9.52 lakh tonnes<sup>2</sup>.

**Table 1.4. Consumption of chemical fertilizers**

(Lakh tonnes)			
Nutrients	2002-03	2003-04	2004-05
Nitrogen (N)	4.20	3.78	4.83
Phosphates (P)	1.51	1.59	2.11
Potash (K)	1.72	1.76	2.58
<b>Total</b>	<b>7.43</b>	<b>7.13</b>	<b>9.52</b>

### 1.8.2. Organic Farming

Due to continuous cropping, indiscriminate use of chemical fertilizers and inadequate application of organic manure to the soil, the general soil health of the State is

getting deteriorated. The organic manure content in the soil has gone down from 1.20% in 1971 to 0.68% in 2002 in Tamilnadu, because of less use of organic inputs. The decline in organic matter content has made undesirable changes in soil biodiversity and disruption in harmony of crop plants, which affects soil fertility and productivity. Considering its importance, the application of bio-fertilizer, green manure, green leaf manure, vermi composting, composting of farm wastes through Pleurotus is popularized as a part of Integrated Plant Nutrient Management Technology<sup>2</sup>.

### 1.8.3. Biofertilizer

Bio-fertilizers are environmentally friendly and its distribution had improved by 1.4 percent to 1312 metric tonnes in 2003-04 followed by a dip (9.67%) 1185 metric tonnes witnessed during 2004-05 (Table 1.5)<sup>2</sup>.

**Table 1.5. Biofertilizer distributed**

(Quantity in Metric tonnes)			
Name	2002-03	2003-04	2004-05
Rhizobium	390	208	270
Azospirillum	712	729	710
Phosphobacterium	192	375	205
<b>Total</b>	<b>1294</b>	<b>1312</b>	<b>1185</b>

### 1.8.4. Agricultural Biotechnology

Genetic manipulation and development of genetically modified organism in human welfare is now showing a potential prospect and risk. Research and application of biotechnology in agriculture is a major policy issue in the present decade<sup>1</sup>.

## 1.9. Horticulture

Tamil Nadu is one of the leading horticulture States in India contributing 7.7 percent to the national horticultural production with 5.7 percent of the national level area. Tamil Nadu has been blessed with diversified agro-climatic

conditions, suitable for a wide range of horticulture crops like fruits, vegetables, spices, plantation crops, flowers and medicinal plants. A large extent of wastelands and under-utilized lands are available in the State for horticulture development. The crop diversification technique has been advocated to boost production and productivity of horticultural crops. The horticultural crops contain remarkable potential for export earnings in the State<sup>2</sup>.

Cardamom and pepper are important spices of Tamil Nadu, Plantation crops of Tamil Nadu are coffee and tea and they are traditionally exported products. Flowers have small areas in Tamil Nadu but the money value of production per hectare is very large. Palmarosa and indigo are cultivated in negligibly small areas, mostly for export.

**Table 1.6. Horticultural crops in Tamil Nadu<sup>2</sup>**

(Area : Lakh Ha., Production : Lakh MT., Productivity : MT/Ha.)						
Crops	2004-2005 (Provisional)			2005-2006 (Estimated)		
	Area	Prdn.	Pdy	Area	Prdn.	Pdy
Fruits	2.39	39.08	16.37	2.58	42.31	16.41
Vegetable	2.06	50.59	24.53	2.23	54.78	24.59
Spices	1.67	7.50	4.50	1.80	8.12	4.51
Plantation Crops	2.53	8.68	3.44	2.73	9.40	3.44
Flowers	0.22	1.75	7.99	0.34	1.89	8.01
Medicinal Plants	0.04	0.08	1.90	0.05	0.09	1.90
<b>Total (All crops)</b>	<b>8.91</b>	<b>107.68</b>	<b>12.09</b>	<b>9.73</b>	<b>116.59</b>	<b>12.12</b>

### 1.10. Agriculture progress, problems and constraints

#### 1.10.1. Depletion of water resources

Tamil Nadu's geographic area consists of 17 river basins, a majority of which are water-stressed. There are 61 major reservoirs; about 40,000 tanks and about 3 million wells, that heavily utilize the available surface water (17.5

BCM) and groundwater (15.3 BCM). Agriculture is the single largest consumer of water in the State, using 75% of the State's water. A recent World Bank report has shown that the agriculture sector faces major constraints due to dilapidated irrigation infrastructure coupled with water scarcity due largely to growing demands from industry and domestic users and intensifying interstate competition for surface water resources. In some parts of the state, the rate of extraction of groundwater has exceeded recharge rates, resulting in falling water tables. Water quality is also a growing concern. Effluents discharged from tanneries and textile industries and heavy use of pesticides and fertilizers have had a major impact on surface water quality, soils and groundwater. The State Government has taken a number of progressive actions on water resources and irrigation management, particularly through the Bank-assisted Tamil Nadu Water Resources Consolidation Project (WRCP). Tamil Nadu was one of the first states to pass a groundwater bill, Procurement/Right to transparency act and a farmers management of irrigation systems act. The State has prepared a planning framework for water resources management, and a State Water Policy<sup>3</sup>.

#### 1.10.2. Smaller size of holdings

*Land holdings-* Constantly rising demography pressure on land is a serious cause for concern. The marginal and small farm holdings accounts for 89% of the total holdings and the area operated by them 52% of the total area. The per capita availability of land has been continuously declining and the availability of cultivable land is even worse. Land is not only an important factor of production, but also the basic means of subsistence for majority of the people in the State of Tamil Nadu<sup>5</sup>.

Together with the shrinking area under cultivation, the pattern of land ownership is also unfavourable for agricultural development. The average size of holdings has declined from 1.25 ha in 1976-77 to 0.95 ha in 1995-96. The

all India figure for average area owned per household is 1.59 ha. This reflects the pressure of population on land. The share of total land operated by small and marginal farmers has increased from 42 percent to 52 percent during the same period. The growth in number and extent of small and marginal farmers is a major hurdle in promoting capital investment in agricultural sector and modernizing agriculture sector. Fragmentation of land results in uneconomic land holdings<sup>5</sup>.

estimated extent of soils affected by salinity and alkalinity is estimated at 2.48 L.ha. besides 1.23 L.ha. suffering from acidic soils<sup>5</sup>.

### 1.10.6. Water logging and marshy land

Excess water hinders plant growth by reducing aeration, which in turn decreases the water absorption and nutrient uptake by roots. The coastal regions of Tamil Nadu face heavy damages due to water logging. The command

**Table. 1.7. Number of holdings in Tamil Nadu (in Lakhs)**

	Classification	53-54	70-71	76-77	80-81	85-86	90-91	95-96
1	Marginal (<1ha)	42.98	31.25	39.51	50.15	54.48	58.48	60.4
2	Small (1 to 2 ha)	8.26	11.09	11.28	12.09	12.6	12.75	13.05
3	Semi-medium (2 to 4 ha)	6.66	6.96	6.83	6.58	6.49	6.18	6.33
4	Medium (4 to 10 ha)	2.61	3.25	3	2.69	2.61	2.27	2.27
5	Large (≥ 10 ha)	0.64	0.59	0.46	0.4	0.39	0.31	0.34
	<b>Total</b>	<b>61.15</b>	<b>53.14</b>	<b>61.12</b>	<b>71.91</b>	<b>77.07</b>	<b>79.99</b>	<b>82.34</b>

*Source : Agricultural Census Reports*

### 1.10.3. Land degradation and soil quality

Land is an important natural resource for agriculture. Land degradation adversely affects agricultural production. Crop yields are dependent on certain soil characteristics- soil nutrient content, water-holding capacity, organic matter content, acidity, top soil depth and soil biomass and so on<sup>5</sup>.

### 1.10.4. Soil erosion

Soil erosion is by wind or water. Erosion causes depletion of fertility through the removal of the valuable and fertile surface soil. In Tamil Nadu erosion is observed in and around 13 lakh ha<sup>5</sup>.

### 1.10.5. Salinity and alkalinity

The adverse effect of salinity in soil is that it hinders crop growth and results in reduction in crop yield. The

areas in major irrigation projects experience waterlogging problem. In Tamil Nadu 44,820 ha. is estimated as marshy lands. About 14 percent of the area in Tamil Nadu is under very poorly drained soils. Another 16 percent is under moderately well drained to well drained soils and 15 percent is somewhat excessively drained soil<sup>5</sup>.

### 1.10.7. Decline in soil organic matter

The soil health is deteriorating. The organic matter content in the soil has gone down from 1.20% in 1971 to 0.68% in 2002 in Tamil Nadu, because of less use of organic inputs<sup>5</sup>.

### 1.10.8. Gullied/ Ravine lands

The gullies are the first stage of excessive land dissection followed by their networking which lead to the development of ravine land. The ravines are extensive



system of gullies developed along nullas, streams and river coarse. It has been estimated that Tamil Nadu has 22,550 ha. under gullied / ravine lands. *Wastelands* are degraded lands that can be brought under vegetative cover.

### 1.10.9. Tannery and Textile Industrial Pollution

The study carried out by the Loss of Ecology Authority, Government of India, revealed that the tannery industries have adversely affected 15,164 ha. of agricultural land in Vellore district and 2,005 ha. in Dindigul district. The Authority had looked into the problem of pollution caused by the tanneries located in Vellore, Dindigul, Kancheepuram, Tiruvallur, Erode and Tiruchi districts and awarded a total compensation of Rs 34.73 crore. This amount, to be recovered from the tanneries, will be used for paying compensation to 36,056 individuals, besides helping in reversing the ecological damage caused by these tannery industries<sup>4</sup>. Tiruppur is a fast growing hosiery 'Industrial City' in Coimbatore district of Tamilnadu. It is located on the bank of the Noyyal river. The effluent discharged by the textile industries released into the Noyyal river pollutes the surface and ground water and damages the agricultural land. An environmental damage assessment study carried out by Madras School of Economics on agricultural lands showed that the total irrigated area declined from 16,262 ha. to 14,262 ha. On the other hand rainfed / non-irrigated land increased from 2108.3 ha. to 2668 ha. The study also showed that irrigated crops like paddy have completely disappeared, resulting in an output loss of Rs. 8.62 lakh in 1994-95 harvest prices. The gross output loss for all crops in the 4 villages studied is Rs. 25.23 lakhs<sup>7</sup>.

### 1.10.10. Mining and Environmental degradation

It has been estimated that 16250 ha are under mining in Tamil Nadu of which 3285 ha are in the district of Salem followed by 3155 ha in Cuddalore district. The other districts which have fairly substantial area under this category include

Namakkal, Perambalur, Tirunelveli and Sivagangai. Sand quarrying results in loss of soil, renders waste farmland, devastates agricultural activities and livelihoods, depletes and salinates groundwater quality and changes river courses.

### 1.10.11. Constraints

Marginalization of land holding, high variability in rainfall distribution, inadequate capital formation by the public sector, declining public investment on agriculture, declining net area sown, over - exploitation of ground water and inadequate storage and post harvest facilities affect the agricultural performance in the state. The state supports seven percent of the country's population but it has only four per cent of the land area and three percent water resources of the country. Of the total gross cropped area, only 50 percent of the area is irrigated in Tamil Nadu. Similarly, of the total area under food grains, only 60 percent of the area is irrigated. Nearly, 52 percent of area is under dry farming conditions in Tamil Nadu apart from stable cropping intensity which is hovering around 120 percent over the period. In spite of the above constraints, the State has made tremendous performance in the production of crops, which is attributed mainly to the productivity increase<sup>1</sup>.

### 1.11. Strategy/ Initiatives by the Government for Agricultural development<sup>5</sup>

The strategies of the Government to achieve the goal in Agricultural sector are;

Adoption of alternative cropping strategies derived for agro-climatic zone based cropping pattern evolved by TNAU to raise remunerative crops and to ensure maximum utilization of available land and water aiming to increase cropping intensity.

As a part of alternative cropping strategy, cultivation of Jatropha, Sugar beet and Sweet sorghum and contract farming through approved Industrial entrepreneurs for the production of ethanol

and bio diesel is encouraged. These crops are remunerative and can be grown in moderately fertile lands with comparatively less water.

Taking up cultivation in vast tract of waste lands through massive comprehensive waste land development programme.

Much emphasis on dry land development integrating watershed development and waste land development programme.

Adoption of dry land development technologies and crop production technologies for dry land crops to step up the productivity.

Identification and promotion of relevant technologies to bridge the gap between the potential yield and actual yield of major crops.

Speedy transfer of technologies to the farming community through ICT (Information and communication technology).

Conduct of Seminars, workshops and intensive pre-season campaigns involving line departments to enthuse and assist farmers to harvest good crops and to get good profit.

Efforts to provide technologies and advice on Agriculture, Horticulture soil and moisture conservation, Animal Husbandry etc., under one roof.

Introduction of Contract farming system for Maize, Oilseeds, Pulses and Cotton in potential districts with assured buy back arrangements at pre-announced price or prevailing market price if it is high. The main objective of the programme is to ensure expansion of area under these crops and to motivate farmers especially SF / MF farmers to get assured remunerative price for the produce.

Ensure availability of quality seeds on enhanced SRR through Public Private Partnership.

Massive adoption of integrated nutrient management and integrated pest management technology with emphasis on ecofriendly agriculture development.

Much focus on restoration of soil through organic farming approach and to promote vermi composting, compost making through pluerotus, green manuring etc.

Efforts to provide site specific macro and micro nutrient recommendations on the basis of soil test villagewise fertility Index.

Promotion of micro irrigation to maximize water use efficiency.

Empowerment of women by revitalizing TANWA groups.

### **1.12. Strategy/ Initiatives by the Government for horticulture development<sup>5</sup>**

Thrust on high tech horticulture and precision farming with micro irrigation and fertigation

Stabilizing the crop area of water loving crops and expanding the area under dry land crops with focus on effective water management and bringing wastelands under horticulture

Focus on need based research and effective coordination with the TNAU and other research institutions

Strengthening the production system for pedigree planting material (private/ Government)

Enactment of State nursery regulation act to regulate and ensure quality standards

Promotion of Organic farming for export market

Building up public- private partnership

Effective transfer of technology by tour-cum-training to farmers

Linkage with Agro Processing Industries.



Post harvest management and reduction of Post Harvest losses.

Strengthening the domestic market system with focus on urban markets as well as rural shandies

Empowerment of farmers with special focus on farmwomen

E-Governance and human resources development through effective training for extension officers.

Promotion of Agri Export Zones (AEZ) for specified crops.

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