

EVALUATION OF MAJOR RAINFED CROP PRODUCTION PROGRAMMES FOR INCREASING THE PRODUCTIVITY IN DRY LAND AGRICULTURE

INTRODUCTION

Agriculture plays a prime role in the Indian economy though its share in the Gross Domestic Product (GDP) has registered a declining trend from 1951 onwards (55.4 per cent in 1950-51 and 14.3 per cent in 2010-11); yet its share in providing employment and livelihood to the population continues to be as high as 63 per cent in 2011. It still has a substantial share in GDP (14.3 per cent, 2010-11). It provides employment to 58.4 per cent of the country's work force and is the single largest private sector occupation. Various important industries in India find their raw materials from agriculture sector; cotton and jute textile industries, vanaspathi industries etc. are directly dependent on agriculture. Handloom, spinning, oil milling, rice thrashing etc. are various small and cottage industries that are dependent on agriculture for their raw materials. Agriculture and its related foods accounts for about 38 per cent of the total foreign export (Ministry of Agriculture 2008-09, 2009-10).

India has achieved a significant progress in agricultural production during the past 58 years especially in food grain production from 50 million tonnes in 1950-51 to 241 million tonnes in 2010-11. The increased food production was mainly achieved through high yielding varieties (HYV), and fertilizer technology of green revolution especially in resource endowed regions. The important natural resources viz. land and water have become increasingly scarce due to multiple uses and at this juncture it is difficult to extend the intensive cultivation. Among the possible alternatives available to increase the agricultural production and to meet the growing demand, 'Dryland agriculture' may be the best alternative.

Though the Green Revolution transformed many regions in the developing world, it did not reach the poor in the dry lands. Poverty, population explosion, water scarcity, land degradation, migration and other health constraints still persist. The low productivity of dryland agriculture, coupled with a changing global environment, further threatens to marginalize agriculture and livelihoods in the dry lands of Asia and sub-Saharan Africa. These areas require

approaches that differ from the Green Revolution strategy. A broad vision for dry lands agriculture would involve reducing poverty, hunger and malnutrition, and ensuring sustainable livelihoods for everyone. This vision can be achieved through a multi-pronged strategy to accelerate the pace of development of dryland agriculture, which requires synergy among technologies, marketing systems, input supplies, credit, policies and institutions. Political will and appropriate policies are needed not only to lift dryland agriculture from stagnation but also to put it on to a higher growth trajectory. The contribution of research and development agencies should focus largely to minimize the effect of recurrent droughts, improve cropping systems, enhance livelihood opportunities, augment agricultural incomes, and participation in trade. Broad-based sustainable growth and development in Asia and sub-Saharan Africa's dry lands is the key to addressing rural poverty in these regions. (Bantilan *et al.*, 2009).

Agriculture security is synonymous with food security, farmer's security and rural sector security. It concerns with seeds, agrochemicals, water, power and soil. It involves the marriage of traditional and modern agricultural practices, the de-facto empowerment of Panchayats and women, the marketing of agro-products at fair prices and the like. Such security required the provision of sources of augmentation of income to agriculturists and village dwellers. Agriculture security in dryland areas is of utmost importance as there exist scope for increasing the agriculture production apart from irrigated area (where there is no much scope for further increasing the area under irrigation) to meet the growing demand for agricultural produces by 2050. The issues of equity, efficiency and sustainability reinforce the need to improve the productivity of dryland agriculture – given that the growth opportunities in irrigated areas are slowly being exhausted. A well targeted approach is sought to address the neglected rural dry lands areas that are to benefit from improvements in agriculture technology and policy apart from question of their insecurity in the basic requirements like input, infrastructure, livelihood security, food security and rural economy security.

Dryland Areas in India

India has about 108 million hectares of rainfed area which accounted for nearly 75 per cent of the total 143 million hectares of arable land. Out of 108 million hectares of total rainfed area, dry lands constitute about 47 million hectares. Dry lands contribute 42 per cent of the total food grain production of the country. These areas produce 75 per cent of pulses, and more than

90 per cent of Sorghum, Millets, Cotton, Groundnut and Pulses from arid and semiarid regions, there by supporting 40 per cent of the country's total population. (<http://www.world-agriculture.com/links.php>)

There are 128 districts in the country which face the problems of dryland. Of these, 25 districts covering 18 million hectares of net area sown with 10 per cent irrigation, receive 375-750 mm rainfall annually spread over in central Rajasthan, Saurashtra regions of Gujarat and rain shadow regions of Western Ghats in Maharashtra and Karnataka. (www.world-agriculture.com)

In dry land agriculture, scarcity of water is the main problem. Apart from the low and erratic behaviour of rainfall, high evaporative demand and limited water holding capacity of the soil constitute the prime constraints in the crop production in dryland areas. Deficiency and uncertainty in rainfall of high intensity causes excessive loss of soil through erosion which leaves the soil infertile. Owing to erratic behaviour and skewed distribution of rainfall, agriculture becomes risky, farmers lack resources and tools, become inefficient and ultimately productivity is low. Yield fluctuations are high mainly due to vagaries of monsoon often much behind the risk bearing capacity of the farmers. The human population in the Indian arid zone is high, a part of which is highly nomadic maintains a high livestock population. The density of both human and livestock population is high as compared to national average which in turn puts the scarce natural resources under severe stress. In arid area, the growing season being very short, millets and short duration pulses dominate the cropping systems. Livestock farming forms the integrated part of this ecosystem. (www.world-agriculture.com).

Developmental Challenges of Dry lands

An overriding feature of dry lands is their low but highly variable precipitation and it is this variability as much as the low quantity that gives dry lands their features, which would in turn create special challenges. Water deficit due to low, erratic unpredictable rainfall, often with intermittent droughts, denies the dryland community's opportunity to have long-term and predictive perspective that is typically reflected in planning and financing frameworks. The situation is expected to worsen in the near future. Climate change is associated with high rates of evaporation that differentiate dry lands from other areas. It is likely to increase the frequency of droughts and related risks every 30 years, compared to every 100 years in the past. (Millennium

Ecosystem Assessment, 2005). The dryland population must thus be supported in order to mitigate and adapt to climate change.

Land degradation, which is estimated at 10-20 per cent in dryland not only threatens human livelihoods but also the habitats for niche plant and animals some of these irreplaceable endemic plants provide alternative crops needed to deliver on Millennium Development Goal 1 (Food security) and medicinal plants required to deliver on Millennium Development Goal 6 (combating HIV/AIDS, malaria and other diseases) particularly with respect to provision of access to affordable drugs made from plants by pharmaceutical companies (Millennium Ecosystem Assessment, 2005). In dry lands, land degradation is particularly evident around permanent settlement and water points where livestock mobility is restricted. All in all, such degradation threatens biodiversity conservation and perpetuates climate change. During drought periods, people in the dry lands emigrate to more hospitable environments, either to cities within their own country or to less stricken areas in foreign nations. This leads to additional economic and environmental pressures on areas that are already fragile and overburdened.

Values of the Dry lands

Important assets in the dry lands are its people who are adapted to the environment hardships of these areas. Dryland people have a high cultural diversity heritage values and indigenous knowledge systems on the medicinal values and use of various plants, trees and shrubs; systems of water harvesting, cultivation practices, climate forecasting and livestock management. The dry land ecosystem has highly resilient species, well adapted to the seasonal rainfall and recurrent droughts, some of the world's most important food crops originated in dry lands. Dry lands are home to a rich biodiversity pool whose potential remains untapped. The biological diversity remains untapped. The biological diversity remains untapped. The biological diversity is of particular importance because it includes many unique biomes. They provide crop and range land resources, forest plants, energy and minerals. Some of the dry land resources that can be tapped to enhance crop production include solar energy, surface water or groundwater. It can be said that dry lands cradle key watersheds and waste lands with potential for agriculture, energy and fishing (Millennium Ecosystem Assessment, 2005)

Problem Focus

India is secure in Agriculture is a greater illusion, since farmer's security, food security and rural sector security are questionable. Since independence several initiatives have been taken by the government to hasten the growth of agriculture sector through Five Year Plans and there are evidences showing the breakthrough in agriculture production, achieving self-sufficiency in food grain production with the help of green revolution technology. By 2050, the country needs to double the food grain production, in order to feed the growing population of about 1.6 billion. This cannot be achieved by irrigated farming alone. In order to meet this challenging future demand for food grains on a sustainable basis, dry land farming has a greater potential. But, it has not been possible to harness the full potential of dry land areas due to the constraints imposing a greater threat to agriculture security in these areas. Due to these constraints, acting as case factors, there has been a very low production and productivity over a long period of time. Therefore it is necessary to understand the components of agriculture security and various constraints existing in dry land are in a specific region rather than in general.

The Green Revolution of the 1960s and 1970s with its package of improved seeds, chemical fertilizers, enhanced farm technology and irrigation, successfully attained its primary objective of increasing crop yields and augmenting aggregate food supplies. However, despite its success in increasing aggregate food supply, the Green Revolution, as a development approach, has not necessarily translated into benefits for the lower strata of the rural poor in terms of greater food security or greater economic opportunity and well-being. It by passed many areas with large numbers of total poor (Freebairn 1995; Pachico et al. 2000; Evenson and Gollin 2003). In particular, vast expanses of dryland regions were by passed by the Green Revolution. They had failed to attract investments in agricultural technology among small holders as well as the commercial sector due to small or nonexistent markets. Further the policy regimes have favored only the irrigated regions and failed to address the continuing marginalization of the dry lands. Past policies on dry lands have failed in another respect as well they focused primarily on the presumed limitations of the natural resource base rather than on the people, their knowledge, skills and capacity for innovation in overcoming or circumventing environmental constraints (Anderson et al. 2003). Recognizing the need to reach the poor in

marginal environments, development planners and policymakers are increasingly eyeing the hitherto less-favoured dryland regions these days, where agricultural transformation is yet to take off. The issues of equity, efficiency and sustainability reinforce the need to improve the productivity of dryland agriculture given that the growth opportunities in irrigated areas are slowly being exhausted. A well-benefit from improvements in agricultural technology and policy. It revealed the potential of the dry land areas to meet the growing demand.

In this context, it is important to have a clear understanding of what has been achieved through the developmental programmes of dry land agriculture in order to suggest a clear strategy for the development of dryland agriculture. With this view, the present study on Evaluation of major rainfed crop production programmes for increasing the productivity in dryland agriculture has been taken up with the following objectives.

- 1) Review the past performance of the dryland agriculture schemes by analysis of secondary data with reference to dryland crops like major oilseeds, pulses and coarse cereals
- 2) To identify the approach, mandate, target and present status of the dryland agriculture schemes
- 3) To identify the gaps, constraints – SWOC analysis of the schemes
- 4) To get feedback from the stakeholders through interactions and Focus Group Discussions
- 5) To suggest measures for further development which will serve as inputs for Twelfth Plan Document

Organisation of the Report

The report has been organised into five chapters. The importance and the need for the study will a focus on the issues in dry land agriculture has been discussed in chapter I. The methodology followed in the present study is discussed in chapter II. A brief introduction about Tamil Nadu Agriculture is presented in chapter III. The various dry land agriculture schemes/Projects/Programmes implemented during the past five years (XIth plan period) has been discussed in chapter IV.

METHODOLOGY

Evaluation plays a vital role in programme planning and implementation of any development programmes. Evaluation is an important activity to bring out the experience from the implementation of development programme. Better planning and implementation is possible through experience gained and the fee back received from the stakeholders of the development programme. Agriculture sector need not only private investment but also public investment. Government at both State and Central Government implement many programmes with huge investment for the development of agriculture sector.

Evaluation in the Context of Development Work

Evaluation of planned development work means that features and processes will have to be described and explained in relation to the plan or plans for that work. A good plan will also guide the evaluation and facilitate collection and analysis of the information that is needed for it. This requires the planners and evaluators share some basic ideas and understanding of the nature of development planning and plans.

Evaluations are undertaken in all spheres of life, in informal or formal ways, whenever one wishes to know and understand the consequences of some action or event. The acquired knowledge and understanding are commonly used by the evaluator to perform some activity in a better manner in the future. It is specially one tries to learn from one's experiences in order to improve one's performance.

Our concern is with the evaluation of planned and organised development work. By 'planned', it means activities for which some guide had been worked out in advance, which usually implies that a plan document has been prepared. By 'organised', it means that the activities are undertaken by some organisation, whether formal or informal, and that they are intended to be performed according to some organisation-based principles and regulations.

Evaluation of development work may be undertaken during the implementation of the respective development programme or project or after it has been completed. In evaluations of development work, *people* are in focus. The overall purpose of such evaluations is usually to

document the results and the utility of the work for individuals or groups of people in the respective society or societies as well as to explore how the results have been created.

To do this well, the programme or project under study needs to be viewed in a broad societal context. It cannot limit to factors internal to the development scheme, but must also deal with relations between the programme or project and numerous factors in its surroundings (environment).

Most through evaluations will, therefore, be *comprehensive*, in the sense that it will cover many topics and issues. This may not allow deep analysis of single factors. However, for the *explanation* of many findings, *specific* economic, technical, cultural, institutional and other factors may have to be analysed, some seven in great detail.

Formal evaluations of development work should always be conducted in a systematic manner; i.e., they should be done conscientiously in accordance with a plan for the investigation, which should at least partly be specified before the evaluation starts.

In principle, one may use a wide range of methods, from the most rigorous statistical ones to purely qualitative assessments and personal interpretations. In practice, the range of applicable methods is dependent on the nature of the development programme or project to be evaluated, the issues which are analysed, the evaluator, and numerous features and conditions of the surrounding society. Usually, the focus on people and the complex and changing nature of societies mean that advanced statistical methods are hardly applicable.

Types and Purposes of Evaluations

Depending on how the provided information is to be used, there are two main types of evaluations viz; *formative* and *summative*. Formative evaluations aim at improving the performance of the programme or project which is evaluated, through learning from experiences gained. For many *programmes*, the scope for evaluations to induce changes of design and implementation may be substantial, due to the frame work nature of programmes. For *projects*, the scope for changes may be limited to fairly modest adjustments, unless one concludes that the project must be re-planned – in full or in part.

In addition to promoting performance of the evaluated scheme through internal learning, formative evaluations may serve as a mechanism to ascertain the *accountability* of people with responsibilities in the respective programme or project. Involved people's perceptions of other involved persons' adherence to rules and regulations, sense of responsibility, and adherence to rules and regulations, sense of responsibility, and sincerity may have strong effect on the general morale at work and, consequently, on work performance. Formative evaluations are commonly done more than once, but each exercise may not be very comprehensive. The evaluations may be done at set intervals or according to needs, as assessed by the responsible agencies, in the course of programme or project implementation. Numerous combinations of their external and/or internal management are imaginable.

Summative evaluations are undertaken after the programme or project has been completed. Their general purpose is to judge the worth of the programme or project and, supplementary, the appropriateness of its design and management. The experiences thus documented may be perceived as learning for planning and implementation of other, similar development endeavours. Commonly, however, the more immediate concern is to assess the accountability of managers and other involved person/organizations. In practice, summative evaluations have largely been triggered by a need among foreign donor agencies to prove their accountability vis-à-vis their governments and/or other money providers as well as the general public in the donor country. For this reason, summative evaluations have mostly been undertaken by persons who are considered independent of the responsible programme or project organizations and the donor agencies.

Evaluations may also be conducted halfway through a programme or project (commonly called mid-term evaluations) or between phases of it. While the main purpose of evaluations thus timed is usually to provide information for any future adjustments of the same programme or project, accountability considerations too may be important.

The emphasis on organisation is seen as an essential means of understanding changes and explaining different degrees of fulfillment of programme and project objectives. Additionally, if such organizational analysis is done in the course of programme or project implementation, it may facilitate adjustments of actions and even innovations during the programme or project

period. It is now commonly considered to be important, especially in relatively complex development schemes which tend to be riddled with uncertainties of many sorts.

Based on the above narration as well as a brief review of literature on evaluation studies the present study on evaluation of the developmental programmes have been organised by considering the following points:

- Recognition of subjectivity in evaluation (i.e., that one can usually not give one 'true' account of what has happened and why):
- An understanding that evaluation can be an empowering process, by which intended beneficiaries can be an empowering process, by which intended beneficiaries can themselves learn to analyse changes affecting their lives and thus propose corrective or additional measures of development. This process is captured through feedback response group discussion with various stakeholders.
- A recognition that quantitative indicators rarely provide much insight and that qualitative indications and reflective verbal analysis are crucial for understanding processes of change;
- Field level primary data collection from beneficiaries to capture quantity variable is not considered because of paucity of time.
- Reviews of earlier studies are considered for arriving meaningful conclusion.

Our explicit terms of reference is development programmes and projects that are implemented in Tamil Nadu during XII Five year Plan period 2007-08 to 2011-12, the formative evaluation approach is followed.

Tools of analysis

Simple tabular analysis was employed to assess the contribution of individual component in the total physical and the financial achievements of various development programmes. Similarly the change in the relevant parameter like input use change between two points of time are estimated by percentage change. The performance of crops interms of area, yield and production pattern have been assessed by trend analysis – compound growth rate.

The compound growth rates are estimated by using the formula:

$$Y = A (1 + r)^t$$

Where,

- Y= Dependent variables like area, production, yield, for which growth rate is estimated
- A= Constant
- r = Rate of annual increment
- t = Time element which takes the value of 1,2,3,.....n

After transforming the model into a linear form by taking logarithms to base 'e',

$$\begin{aligned} \ln Y &= \ln A + t \ln (1 + r) \\ \text{Let, } \ln A &= a \\ \ln (1+r) &= b \\ \text{So, } \ln Y &= a + bt. \\ (1 + r) &= \text{Anti ln of } b \\ r &= (\text{Anti ln of } b) - 1 \end{aligned}$$

The semi log function is linear in parameters (linear relationship between Y and t), and hence, it can be fitted by the method of Ordinary Least Squares (OLS) Technique.

The compound growth rate (r) is obtained by the following formula and generally expressed in terms of percentage.

$$r = [(\text{Anti ln of } b) - 1] \times 100$$

The significance of growth rate was tested by applying student 't' test statistic (Laxmanan *et al.* 2005)

$$t = r / \text{S.E.}(r) \text{ with } (n-2) \text{ df}$$

where,

- S.E.(r) = $100 b \times \text{S.E.}(\log b) / \log_{10} e$
- r = the Compound growth rate
- n = number of year
- S.E.(r) = standard error
- Df = degrees of freedom

$$t = r / \text{S.E.}(r) \text{ follows student 't' distribution with } n-2 \text{ degrees of freedom}$$

According to log base rule, $\ln_e 10$ is worked out to be 2.3025 which follows 't' distribution with (n-2) degree of freedom, n is number of year considered under study. Pattern of growth rates over the years was identified using the 'b' co-efficient.

TAMILNADU STATE AGRICULTURE

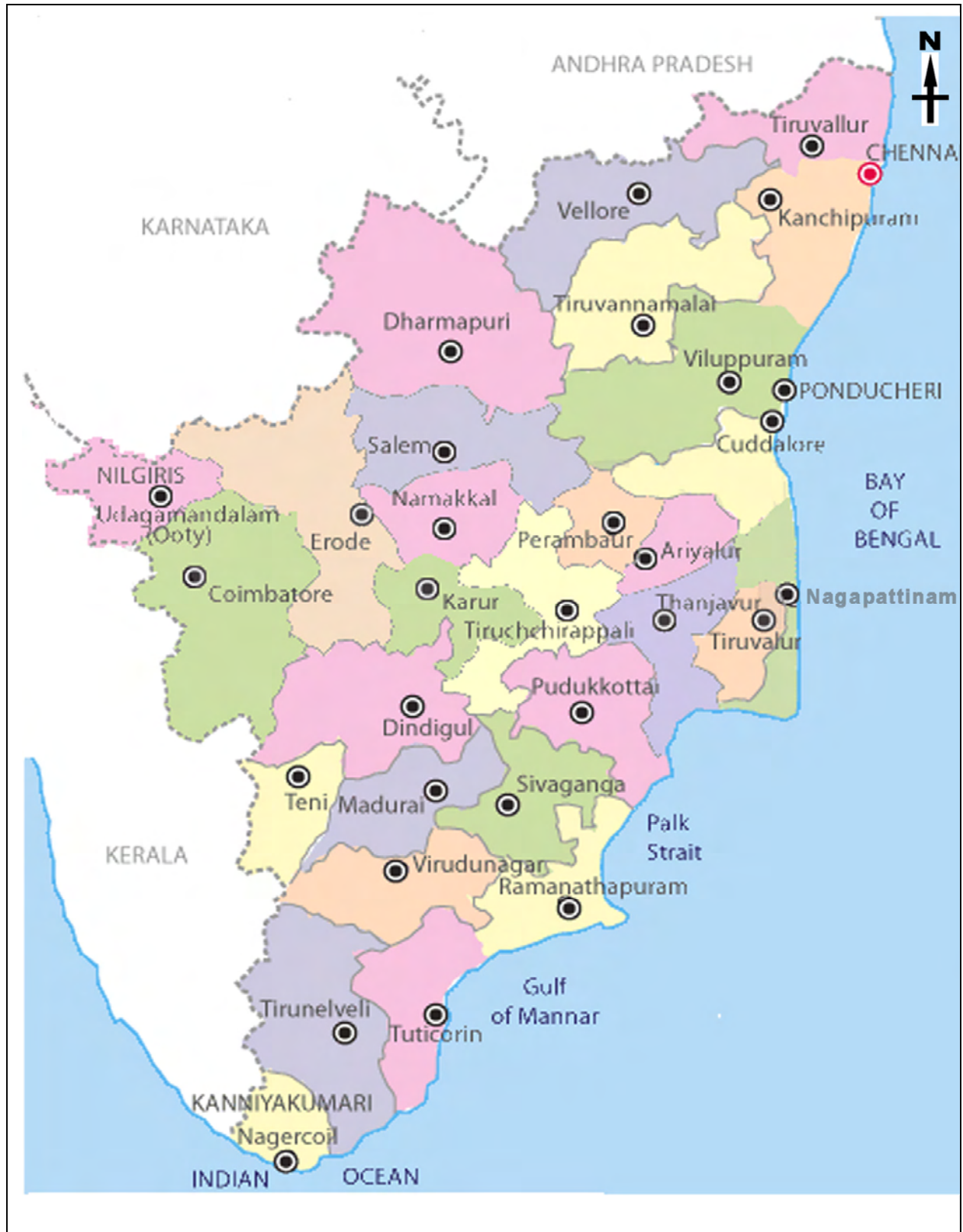
Tamil Nadu is located in the Northern hemisphere in the hot zone between 8° and 13° N latitude and between 78° and 80° E longitude. Tamil Nadu is the eleventh largest State in India by area (about the size of Greece) and the seventh most populous State. It is one of the 28 States of India and lies on the eastern coast of the southern Indian peninsula bordered by Puducherry, Kerala, Karnataka and Andhra Pradesh States. Tamil Nadu is bound by the Eastern Ghats in the North, the Nilgiris, the Anamalai Hills and Palakkad in the West, Bay of Bengal in the East, Gulf of Mannar and Palk Strait in the South East and Indian Ocean in the South. The eastern most point is formed by the Point Calimer and the Mudumalai wildlife sanctuary in the Western most point. The Pulicat Lake is situated in the northern extreme. The southern most tip of Tamil Nadu is the Cape Comorin or Kanyakumari. West and north of the State has lofty hills while the East and South are Coastal plains.

Tamil Nadu is the fifth largest contributor to India's GDP and the most urbanized State in India. The State has the highest number (10.56 per cent) of business enterprises in India, compared to the population share of about 6 per cent. Tamil Nadu has a coastline of about 1, 076 kilometers which is the country's third longest coastline. Tamil Nadu has a wide variety of minerals with the most lignite (almost 90 per cent of India's reserves), magnetite (45 per cent) and garnet (over 40 per cent) reserves in India, among others. Tamil Nadu contributes 15 per cent of the total salt production in the country. Forests cover over 17 per cent of the State's geographical area with several protected areas of Tamil Nadu including wildlife and bird sanctuaries.

Agro-Ecological Systems

Besides, Tamil Nadu can also be classified under four Agro-ecological systems. There are 16 zones showing distinct soil characteristics under Hill Ecosystem, Upland ecosystem, Plain Ecosystem and Coastal ecosystem.

Fig.1. District location map of Tamil Nadu state



Administrative Divisions

Currently, Tamil Nadu is divided into 32 districts including the recently formed Tirupur district. For reasons of administration, the districts of the State have been bifurcated over years giving rise to as many as 32 districts. For instance, Erode (1976) was carved out of Coimbatore, Dharmapuri (1965) and Namakkal districts (1997) were originated from Salem district and Pudukkottai (1974), Karur (1996), Nagapattinam (1991), Thiruvarur (1997) and Perambalur (1996) districts were delineated from the erstwhile Thanjavur and Thiruchirappalli districts. Sivagangai and Virudhunagar districts (1994) were carved out of Ramanathapuram, while Dindigul (1985) and Theni (1997) districts were originated from Madurai district. Tirunelveli district was bifurcated into Tirunelveli and Thoothukudi districts (1986), while North Arcot district was bifurcated into Thiruvannamalai district (1989) and Vellore district (1989) and South Arcot district into Cuddalore district and Villupuram district (1993). Chengalpattu district was bifurcated into Kancheepuram and Thiruvallur (1996) districts. Krishnagiri district (2003) came into existence from Dharmapuri district along with certain parts of Salem district. The newly formed Tiruppur district was formed out of Coimbatore district (2009).

The details of administrative divisions in Tamil Nadu State are furnished in Table 1. The State comprises of 32 districts, 212 taluks, 391 blocks, 578 town Panchayats, 158 municipalities and ten municipal corporations for smooth functioning of the State.

Table 1. Details of Administrative Divisions in Tamil Nadu State

Sl. No.	District Name	Number of Taluks	Number of Blocks	Number of Town Panchayats	Number of Municipalities	Municipal Corporations
1	Ariyalur	3	6	2	2	-
2	Chennai (Tamil Nadu State HQ)	5	Nil (Urban District)	-	-	Chennai
3	Coimbatore	6	12	52	11	Coimbatore
4	Tiruppur	7	13	17	7	-
5	Cuddalore	6	13	16	5	-
6	Dharmapurai	5	8	10	1	-
7	Dindigul	8	14	24	3	-
8	Erode	7	20	53	10	Erode
9	Kancheepuram	8	13	24	10	-
10	Kanniyakumari (HQ at Nagercoil)	4	9	56	4	-
11	Karur	4	8	11	4	-
12	Krishnagiri	5	10	7	2	-
13	Madurai	7	13	12	6	Madurai
14	Nagapattinam	7	11	8	4	-
15	Namakkal	4	15	19	5	-
16	Perambalur	3	4	4	1	-
17	Pudukkottai	9	13	8	2	-
18	Ramanathapuram	7	11	7	4	-

19	Salem	9	20	33	4	Salem
20	Sivagangai	6	12	12	3	-
21	Thanjavur	8	14	22	3	
22	The Nilgiris (HQ at Udagamandalam)	6	4	11	4	-
23	Theni	5	8	22	6	-
24	Thiruvallur	8	14	13	12	-
25	Thiruvarur	7	10	7	4	-
26	Thoothukudi	8	12	19	3	Thoothukudi
27	Thiruchirappalli	8	14	17	3	Tiruchirappalli
28	Tirunelveli	11	19	36	7	Tirunelvrli
29	Tiruvannamalai	7	18	10	4	-
30	Vellore	8	20	22	14	Vellore
31	Villupuram	8	22	15	3	-
32	Viruthunagar	8	11	9	7	
	Total	212	391	578	158	

Source: Tamil Nadu Economic Appraisal (2005-06), Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.

Rainfall

The quantum and distribution of rainfall influence the pattern of cropping and crop growth in a locality. The agricultural production and productivity of crops mainly depends on the timely onset of South-West and North-East monsoon and the quantum and spread of rainfall. Therefore, the details on the normal annual rainfall pattern, district-wise in Tamil Nadu have been presented in Table 2.

The average normal rainfall of 958.40 mm was received in the State as a whole. About 49 per cent of the total average rainfall was received during North-East monsoon, while about 32 per cent received during South- West monsoon. The balance of about 19 per cent was obtained during winter as well as summer months, as could be evidenced from the table. It is also pertinent to note that the districts of Salem, Namakkal and Dharmapuri received almost equal quantities of rainfall in both South-West and North-East monsoons. On the other hand, Krishnagiri and the Nilgiris are benefited more by the South-West monsoon. All other districts are benefited mostly by North-East monsoon.

As regards geographical distribution of rainfall in the State, the maximum normal rainfall of about 1700 mm is received in the Nilgiris district, while the minimum of about 694 mm is received in Thoothukudi district. The rainfall pattern reveals the fact that almost all the mid and northern coastal districts receive more than 1000 mm of normal rainfall. The mid-inland and southern districts, receive lesser than 1000 mm. Because of high rainfall and high elevation, the sub-tropical and temperate crops like coffee, tea, hill vegetables, peaches, plums, straw berries etc, are grown in the Nilgiris district. On the other hand, in the remaining plains of Tamil Nadu characterized by tropical climate, the field crops like paddy, cholam, cumbu, groundnut, sugar cane, banana, cotton, etc are cultivated. Even among the districts in the plains, in mid and northern coastal districts, paddy is predominantly grown in wetlands in larger areas, while in the mid and northern in-land districts, garden land crops like cholam, cumbu, ragi, maize, ground nut, cotton etc are cultivated. Southern districts are characterized more by dryland agriculture due to low rainfall regime and hence cotton, pulses, cholam, cumbu etc are predominantly grown under rainfed conditions and in a few pockets where irrigation facilities are available, farmers resort to invariably for paddy cultivation. However, the southernmost district viz. Kanyakumari, comes under high rainfall zone and hence the paddy and plantation crops like rubber are grown.

Table 2. District wise Distribution of Normal rainfall**(in mm)**

Sl. No	District	South-west	North-East	Winter	Hot Weather	Total
		(June - Sep)	(Oct-Dec)	Jan & Feb	March to May	
		Normal	Normal	Normal	Normal	
1	The Nilgris	1060	367.7	30.8	237.2	1695.7
2	Chennai	443.5	753.1	37.3	64.2	1298.1
3	Kancheepuram	462.7	697.2	32.1	60.1	1252.1
4	Thiruvallur	449.5	604.1	33.5	65.7	1152.8
5	Cuddalore	373.6	716.5	56.4	89.3	1235.8
6	Villupuram	433	484.8	34.5	77.1	1029.4
7	Thanjavur	342	545.7	50.7	114.6	1053.0
8	Thiruvarur	301.8	665.4	57.9	104.8	1129.9
9	Nagapattinam	274.1	886.4	81.5	99.7	1341.7
10	Pudukkottai	350.7	418	38.2	114.6	921.5
11	Thiruvannamalai	465.8	439.8	32.8	108.2	1046.6
12	Vellore	442	353	20.3	101.7	917
13	Dharmapurai	361	316.7	18.5	156.9	853.1
14	Krishnagiri	403.6	290.9	14.3	154.7	863.5
15	Salem	380	347	21.3	149.7	898.0
16	Namakkal	317	291	18.1	150.4	776.5
17	Erode	213.1	323.5	20.7	154.1	711.4
18	Coimbatore	192.9	327	26.1	148.4	694.4

19	Tiruchirapalli	270.3	356.1	25	110.1	761.5
20	Karur	249.7	365.4	24	103.1	742.2
21	Perambalur	349.6	449.6	34.5	115.9	949.6
22	Madurai	305.5	373	29.8	131.8	840.09
23	Theni	178.4	384	48.4	222.7	833.5
24	Dindigul	251.4	399.2	33	148	831.6
25	Ramanathapuram	136.1	507.4	53.9	123.8	821.2
26	Virudhunagar	181.8	431.2	42	174.6	829.6
27	Sivagangai	289.6	415.5	35.8	135.1	876.0
28	Thirunelveli	92.6	429.8	72.6	141.9	736.0
29	Thoothukudi	86.8	410.1	46.6	112.2	655.7
30	Kanniyakumari	327.8	427.4	33.4	217.4	1006.0
	State average	332.8	459.2	36.8	129.6	958.4
Season – wise Share (%)		34.73	47.91	3.84	13.52	100.0

Source: Tamil Nadu Economic Appraisal (2005-06), Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.

Month wise/ Season wise Distribution of Rainfall

The month wise and season wise distribution of rain fall in the triennium ending 1998-99 and 2009-10 for Tamil Nadu State is furnished in Table 3. It could be seen from the table that the annual rain fall received in the triennium ending 2009-10 was 1041.90 mm and it had exhibited a decline of 6.80 per cent as compared to the triennium ending 1998-99. The season wise distribution of rain fall received indicated that nearly 49.61 per cent of rainfall was received in north west monsoon followed by south west monsoon (31.74 per cent), hot weather period (16.54 per cent) and winter season (2.11 per cent) in that order in the triennium ending 2009-10.

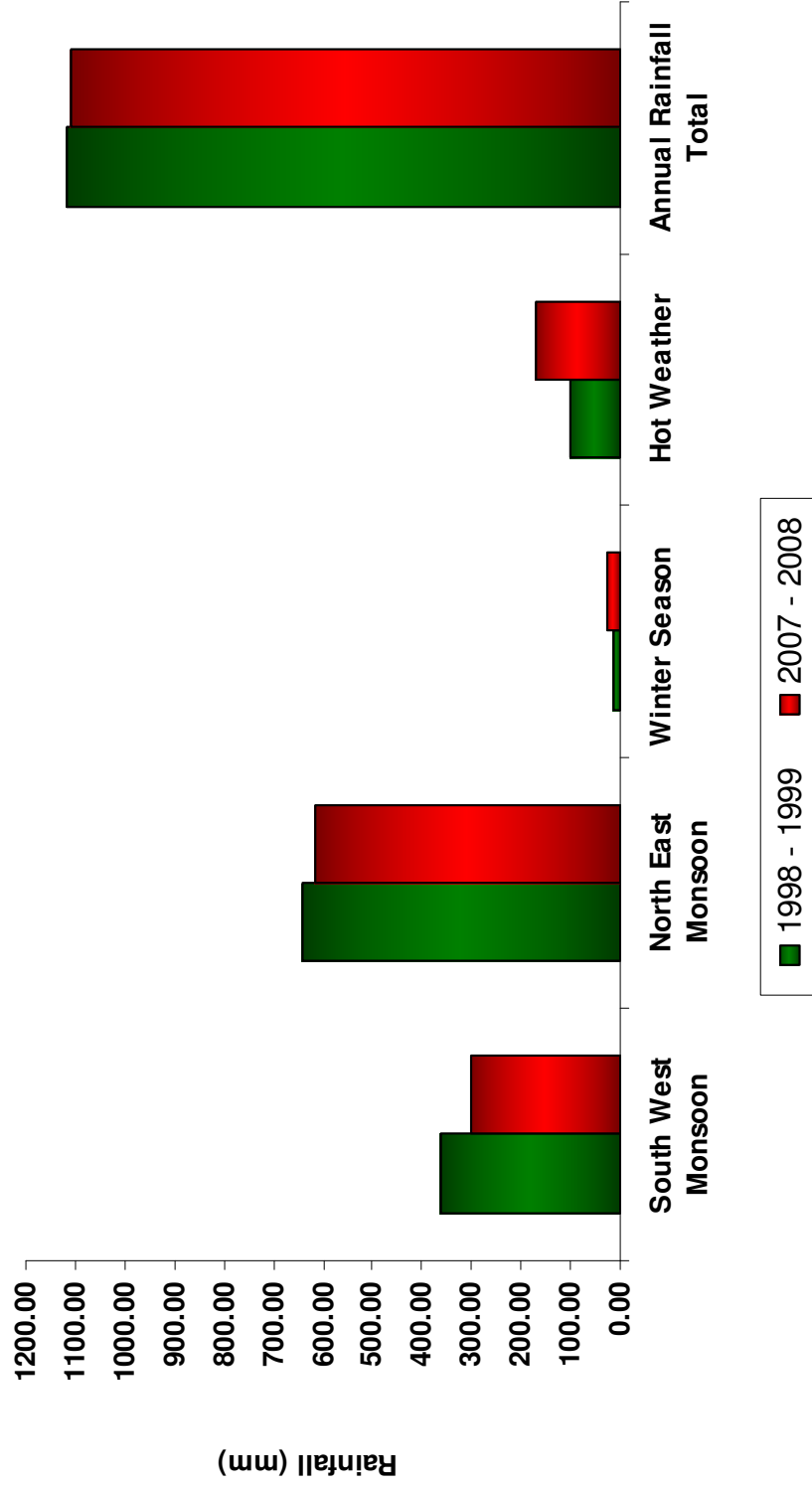
Table.3. Month wise / Season wise Rainfall Distribution in Tamil Nadu State (in mm)

Particulars	Triennium ending		Percentage changes
	1998-99	2009-10	
South-West Monsoon			
June	65.53 (5.86)	45.43 (4.36)	-30.67
July	56.77 (5.08)	70.97 (6.81)	25.01
August	103.50 (9.26)	122.67 (11.77)	18.52
September	134.50 (12.03)	91.63 (8.79)	-31.87
Total	360.30 (32.23)	330.70 (31.74)	-8.22
North-East Monsoon			
October	176.93 (15.83)	169.83 (16.30)	-4.01
November	245.33 (21.95)	223.23 (21.43)	-9.01
December	219.67 (19.65)	123.83 (11.89)	-43.63
Total	641.93 (57.42)	516.90 (49.61)	-19.48
Winter Season			
January	7.13 (0.64)	10.77 (1.03)	51.05
February	6.20 (0.55)	11.17 (1.07)	80.16
Total	13.33 (1.19)	21.93 (2.11)	64.52
Hot Weather			
March	5.50 (0.49)	69.00 (6.62)	1154.55
April	38.50 (3.44)	27.73 (2.66)	-27.97
May	51.70 (4.62)	73.97 (7.10)	43.08
Total	102.37 (9.16)	172.37 (16.54)	68.38
Annual Rainfall	1117.93 (100.00)	1041.90 (100.00)	-6.80

Figures in parentheses () indicate percentage to total annual rainfall.

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to 2009-10,
Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Fig.2. Season wise rainfall distribution in Tamil Nadu State



Hot Weather			
March	5.50 (0.49)	76.93 (6.93)	1298.79
April	38.50 (3.44)	40.40 (3.64)	4.94
May	51.70 (4.62)	53.50 (4.82)	3.48
Total	102.37 (9.16)	170.83 (15.40)	66.88
Annual Rainfall	1117.93 (100.00)	1109.53 (100.00)	-0.75

Figures in parentheses () indicate percentage to total annual rainfall.

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2005-06 to

2007- 08, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

It could also be seen that a reduction in the quantum of rain fall to the extent of 8.22 and 19.48 per cent was observed in South-west monsoon and north-east monsoon in the triennium ending 2009-10 as compared to the triennium ending 1998-99. On the contrary, an increase of 64.52 and 68.38 per cent in the quantum of rainfall received during winter season and hot weather period, was noticed in the triennium ending 2009-10 as compared to the quantum of rainfall received in the respective season in the triennium ending 1998-99. The month wise distribution of rainfall revealed that relatively less amount of rainfall was received in Tamil Nadu State in the month of January, February, April, June, July, August and September in the triennium ending 2009-10 as compared to the triennium ending 1998-99.

Land Use Pattern

Land use statistics in general indicate the way in which the land area is put under various uses. Land as a scarce resource is to be managed effectively to benefit the human race that depends on the land for its livelihood. The details of land use pattern in Tamil Nadu State in the triennium ending 1998-99 and 2009-10 are furnished in Table 4. A perusal of the table indicates that the area under forest was around 21.12 lakh hectares and it accounted for 16.22 per cent of the total geographical area in Tamil Nadu State in the triennium ending 2009-10. As compared to the triennium ending 1998-99, the area under forests declined to the extent of 1.12 per cent in the triennium ending 2009-10. However, to maintain the ecological balance, 33.00 per cent of the geographical area must be under forest cover. This indicated that afforestation should be taken up on war- footing. Since the scope for bringing more

area under natural cover is almost an impossible proposition, efforts must be dovetailed for intensification of natural cover in forest area as well as on hills and hillocks and planting the tree crops in shrub jungles, village waste lands and farms in almost all the districts in the State.

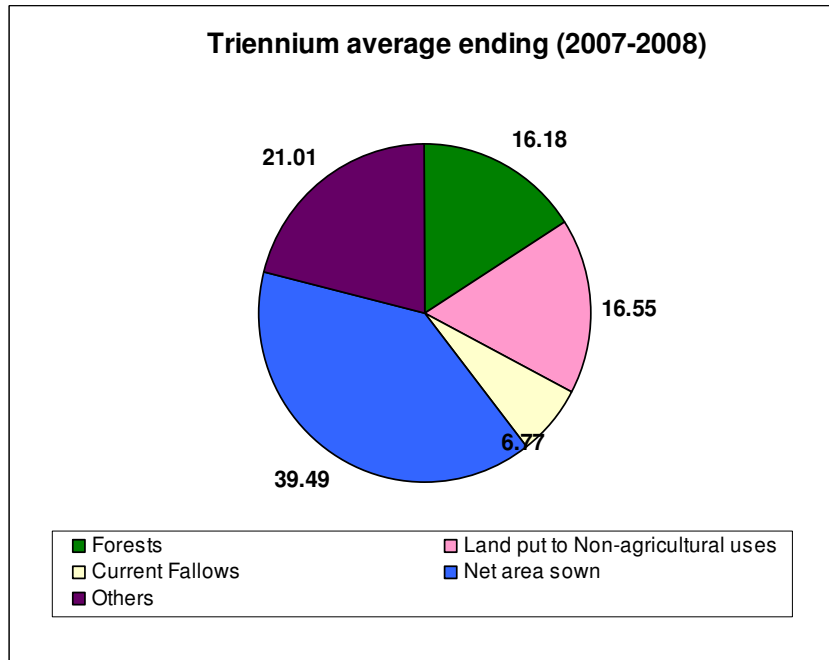
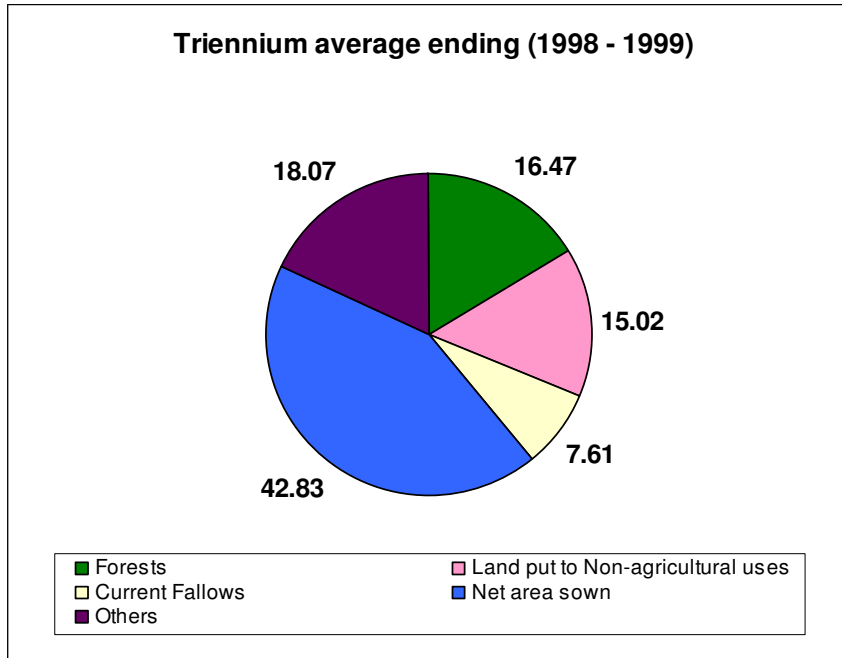
Table.4. Land Use Pattern in Tamil Nadu State(Area in ha)

Sl. No.	Particulars	Triennium ending		Percentage changes
		1998 - 99	2009 -10	
1	Total Geographical area	12997644.00 (100.00)	13028787.33 (100.00)	0.24
2	Forests	2140455.00 (16.47)	2112798.67 (16.22)	-1.29
3	Barren and uncultivable lands	479555.30 (3.69)	491490.67 (3.77)	2.49
4	Land put to Non-agricultural uses	1952264.00 (15.02)	2172466.67 (16.67)	11.28
5	Culturable waste	345792.00 (2.66)	335591.70 (2.58)	-2.95
6	Permanent Pastures and other grazing lands	124292.00 (0.96)	110020.00 0.84	-11.48
7	Miscellaneous tree crops and groves not included in the net area sown	231795.70 (1.78)	257606.00 (1.98)	11.13
8	Current Fallows	989253.00 (7.61)	1037026.00 (7.96)	4.83
9	Other fallow lands	1167011.00 (8.98)	1512802.00 (11.61)	29.63
10	Net area sown	5567226.00 (42.83)	4998985.70 (38.37)	-10.21
11	Area sown more than once	980009.70	738058.33	-24.69
12	Total Cropped area	6547235.00	5737044.00	-12.3746

Figures in parentheses () indicate percentage to total geographical area

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to 2009-10,
Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Fig.3.Land use pattern in Tamil Nadu state (in percentage)



The barren and uncultivable land in Tamil Nadu State in the triennium ending 2009-10 was 4.91 lakh hectares as compared to 4.79 lakh hectares in the triennium ending 1998-99. Thus an increase of 0.20 lakh hectares was observed over a period of ten years. This trend has to be arrested and there exist vast scope to reduce the extent of barren land through waste land development efforts.

The area under cultivable waste land was 3.55 lakh hectares in the triennium ending 2009-10 as compared to 3.46 lakh hectares in the triennium ending 1998-99. Thus there had been a decadal variation of 2.95 per cent. Efforts have to be taken to arrest the increasing trend of cultivable waste lands.

Other fallow lands, which are also otherwise considered as wastelands have shown an alarming trend. While it was 11.67 lakhs hectares in the triennium ending 1998-99, it was 15.12 lakh hectares in the triennium ending 2009-10. This upsurge is a serious problem that needs the immediate attention of planners and policy makers.

The area under current fallows was quite high in triennium ending 1998-99 with 9.89 lakhs hectares and it has increased to 10.37 lakhs hectares in the triennium ending 2009-10 exhibiting a decadal increase of 4.83 per cent. This is a good sign and might be due to tapping of ground water and stabilization of ayacuts under irrigation systems in some areas. Further reduction of current fallows is quite possible by the modernization of irrigation systems and to adoption of water harvesting techniques in addition of other moisture conservation measures.

The net area sown in Tamil Nadu State had reduced from 55.67 lakhs hectares in the triennium ending 1998-99 to 49.99 lakhs hectares in the triennium ending 2009-10 there by exhibiting of a decline of 10.25 per cent. This is a disturbing trend that needs immediate attention of policy makers and planners. This might be due to marked increase in lands put to non-agricultural uses due to rapid industrialization and urbanization. The lands put to non-agricultural uses had increased from 19.52 lakhs hectares in the triennium ending 1998-99 to 21.56 lakhs hectares in the triennium ending 2009-10 and it showed a decadal variation of 10.43 per cent.

The area sown more than once had shown a drastic declining trend during the period under consideration. In fact, the area sown more than once declined from 9.80 lakhs hectares in triennium ending 2009-10 to 7.38 lakhs hectares in the triennium ending 2009-10, in spite of modernization of existing irrigation system and more tapping of ground water. The steep fall in area sown more than once is a serious issue that needs immediate attentions. There exists scope to arrest this declining trend and

to either increase or atleast stabilize the area sown more than once through rehabilitation of existing irrigation systems and structures and energisation of pumpsets and motors at a faster rate through pumping more of public investments.

The cropping intensity for the State as whole as could be visualized from the table decreased from 117.60 per cent in the triennium ending 1998-99 to 114.63 per cent in the triennium ending 2009-10. This down trend must be reversed to keep agriculture growing at a faster rate.

In sum, perusal of land use statistics of Tamil Nadu State clearly showed that there exist scope for

- i) Arresting the down trend in the net sown area and its stabilization.
- ii) Reducing the extent of current fallows
- iii) Developing waste lands like barren and uncultivable lands as well as other fallow lands.
- iv) Regulation for preventing diversion of lands to non-cultivable uses and
- v) Intensive fodder development activities

Ramification of Wells

With the dwindling ground water level what is more important is to identify the gadgets used for lifting water. The details on ramification of wells are presented in Table 5. It could be seen that the number of tube wells increased from 1.29 lakhs in the triennium ending 1998-99 to 2.03 lakhs in the triennium ending 2009-10 and it amounted to 50.04 per cent over a period of ten years. Among the tube wells, the tube wells fitted with electrical pumpsets showed a decadal increase of 69.33 per cent. On the contrary, wells fitted with diesel engine declined considerably during the period under question.

The total number of dug cum bore wells increased from 11,538 in the triennium ending 1998-99 to 18,942 in the triennium ending 2009-10 thus exhibiting a decadal increase of 94.38 per cent. It could be noticed that the dug cum bore wells fitted with electrical pumpset increased by 36.51 per cent and diesel pumpsets has increased by 19.88 per cent during the same period.

Table 5. Ramification of Wells in Tamil Nadu State
(in numbers)

Particulars	Triennium ending		Percentage changes
	1998 - 1999	2007 - 2008	
Wells used for irrigation purpose (Numbers)			
Tube Wells			
Electrical Pumpsets	104642	177171	69.31
Diesel Pumpsets	24879	10245	-58.82
Others	-	6917	-
Total	129520	194332	50.04
Bore Wells			
Electrical Pumpsets	-	31058	-
Diesel Pumpsets	-	1278	-
Others	-	1814	-
Total	-	34150	-
Dug cum bore Wells			
Electrical Pumpsets	10916	19441	78.09
Diesel Pumpsets	621	1043	67.86
Others	-	1935	-
Total	11538	22491	94.31
Open Wells			
Electrical Pumpsets	1101525	1294872	17.55
Diesel Pumpsets	319907	229965	-28.12
Others	213534	44394	-79.21
Total	1634966	1569231	-4.02
Wells used for industries	-	67566	-
Wells used for domestic purpose			
Electrical Pumpsets	94962	474177	399.33
Diesel Pumpsets	550	4792	771.33
Others	524691	191715	-63.46
Total	620203	670684	8.14

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2005-06 to 2007-08, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

The open wells used for irrigation had declined from 16.34 lakhs in the triennium ending 1998-99 to 15.27 lakhs in the triennium ending 2009-10 in Tamil Nadu State. The decline of open wells amounted to 7.07 per cent. Further it could be noticed that open wells fitted with electrical pumpsets had increased by 18.24 per cent unlike that of open wells fitted with diesel pumpsets and other draft power which showed a significant declining rate of 117.0 and 555 per cent respectively. This may be due to dwindling water table and free supply of electricity for agricultural purpose.

Wells used for domestic purpose increased from 6.20 lakhs in the triennium ending 1998-99 to 6.71 lakhs in the triennium ending 2009-10. The same phenomenon was observed in the wells (used for domestic purpose) fitted wells electrical pumpsets and diesel pumpsets as well.

The total of number of tanks in Tamil Nadu State increased from 39,102 in the triennium ending 1998-1999 to 40,946 tanks in the triennium ending 2009-10. The increase in the number of tanks was more pronounced in the tanks with an ayacut area of more than 40 hectares (6.53 per cent) than the tanks with the ayacut area of less than 40 hectares (5.28 per cent). There has been an alarming trend in the number of tube wells in the triennium ending 2009-10. The decadal variation of number of tube wells in the triennium ending 2009-10 was found to be 32.81 per cent.

The dug cum bore wells increased from 11,538 in the triennium ending 1998-99 to 18,942 in the triennium ending 2009-10. The open wells also increased to the extent of 11.92 per cent in the triennium ending 2009-10 as compared to the triennium ending 1998-99.

On the contrary, the number of wells used for irrigation purpose had reduced from 16.53 lakhs in the triennium ending 1998-99 to 15.27 lakhs in 2009-2010. However, the number of wells used for domestic purpose exhibited a positive trend and it increased from 6.20 lakhs in the triennium ending 1998-99 to 6.71 lakhs in the triennium ending 2009-10 there by exhibiting a decadal variation of 8.21 per cent. The number of wells not in use also exhibited a decadal variation of 8.21 per cent in the triennium ending 2009-10. Hence concerted efforts have to be taken up to analyse the reason for wells not in use and suitable ameliorative measures should be taken up.

Sources of water supply

Tamil Nadu with seven per cent of the population of the country is endowed with three per cent of water resources of India. The States water resources are dependent on rainfall. All river system of the State flow eastward from the western Ghat and are rainfed. The Palar, the Pennaiyar and the Cheyyar

are the three important river systems in the north. None is perennial Cutting across the centre of the State is the Cauvery fed by both the monsoons. It is practically perennial, although in recent years, this has become drier mainly to the impounding of water in the dams of Karnataka. Yet, along with its tributaries the Bhavani and Amaravathi, it is the most important source of canal irrigation. South of Cauvery are three important rivers, namely the Vaippar, the Vaigai and Tamirabarani. Of these, Tamirabarani is perennial and a source of channel irrigation. Besides these, there are several other smaller and less important rivers in the State. The different sources of water supply in Tamil Nadu State are furnished in Table 6.

**Table 6. Different Sources of Water Supply in Tamil Nadu State
(in numbers)**

Particulars	Triennium ending		Percentage changes
	1998 - 99	2009 - 10	
Canals			
No.	2325	2239	-3.70
Length	9705	9736	0.32
No of reservoirs	67	78	16.42
Tanks with ayacut of			
>40 ha	7494	7983.333	6.53
<40 ha	31608	33278	5.28
Total	39102	41251.33	5.50
Tube wells	146318	202661.33	38.51
Dug cum bore Wells	11538	18942	64.17
Open Wells	1634966	1829887	11.92
No of wells used for domestic purpose	620203	671102	8.21
No of wells not in use	150247	75661.33	-49.64
No of wells used for Irrigation purpose	1653289	1527060.33	-7.64

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to 2009-10, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

It could be seen that the number of canals in the State had reduced from 2325 canals in the triennium ending 1998-99 to 2290 canals in the triennium ending 2009-10. Thus there had been a decline of 3.20 per cent in the number of canals during the period under consideration. On the contrary there had been a decadal change of 0.32 per cent in the length of the canals.

The number of reservoirs showed an increase of 116.42 per cent during the period under question.

Area irrigated by different sources of water supply

The area irrigated by different sources in Tamil Nadu State in the triennium ending 1998-99 and 2009-10 is furnished in Table 7. It is evident from the table that the net area irrigated by canals had declined from 8.24 lakhs hectares in the triennium ending 1998-99 to 5.23 lakhs hectares in the triennium ending 2009-10 exhibiting a decline of 36.51 per cent. The area irrigated more than once by canals dwindled down to 7.71 per cent in the period under question. Consequently, the gross area irrigated had reduced from 9.72 lakhs hectares in the triennium ending 1998-99 to 6.24 lakhs hectares in the triennium ending 2009-10.

There had been a drastic decline in the net area and gross area irrigated by tanks in Tamil Nadu and both net area and gross area irrigated declined to the extent of 47.44 and 51.05 per cent respectively.

On the contrary, there had been an up surge in the area irrigated by tube wells, mainly because of increase in the number of tube wells to the extent of 38.51 per cent during the period under question. Both the net area and gross area irrigated by tube wells increased to the extent of 24.28 and 14.94 per cent respectively during the period under consideration. The net area and gross area irrigated by ordinary wells (sole irrigation) had also exhibited declining trend during the period under question and the reduction in area was more pronounced in the gross area irrigated by ordinary wells. The same phenomenon was observed in the case of ordinary wells (supplementing other sources) as well.

The net area irrigated by all sources had declined from 29.25 lakhs hectares in the triennium ending 1998-99 to 19.91 lakhs hectares in the triennium ending 2009-10 exhibiting a reduction in the area to an extent of 1.17 per cent during the period under question. Area irrigated more than once had been drastically declined to the extent of 29.07 per cent during the period under consideration. Consequently the irrigation intensity had declined from 119.16 per cent in the triennium ending 1998-99 to 121.14 per cent in the triennium ending 2009-10.

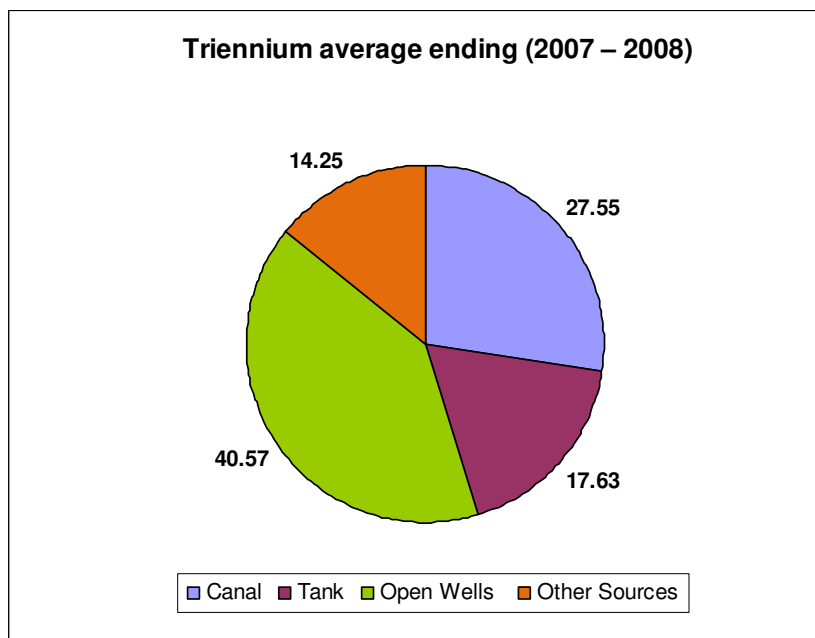
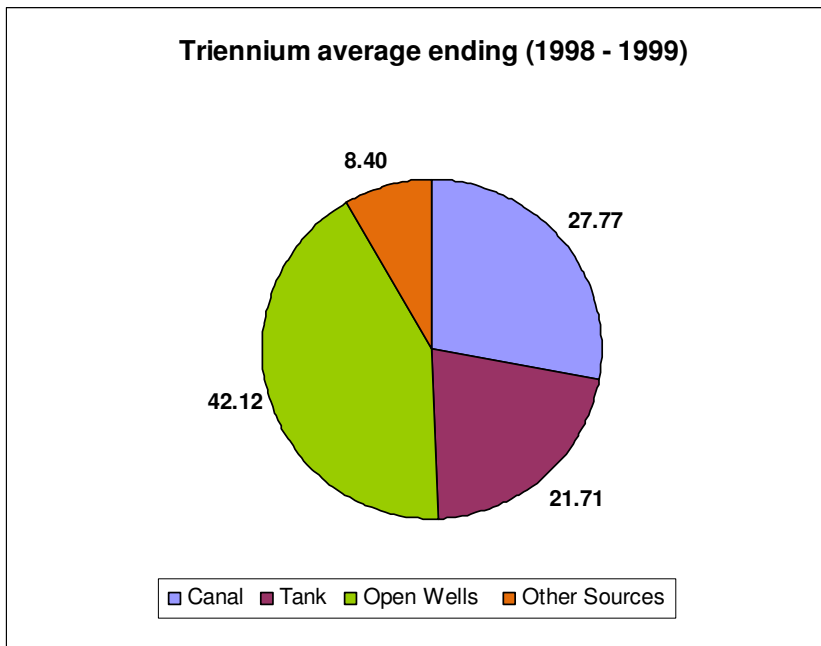
**Table 7. Area Irrigated by Different Sources of Water Supply in Tamil Nadu State
(Area in ha)**

Particulars	Triennium ending		Percentage changes
	1998 - 99	2009- 10	
Canals			
Net Area	824512.00 (28.19)	523483.00 (26.29)	-36.51
Gross Area	972012.67 [27.77]	624231.67 (18.95)	-35.78
Tanks			
Net Area	662926.67 (22.66)	348418.67 (17.50)	-47.44
Gross Area	759805.00 [21.71]	371900.33 (11.29)	-51.05
Tube wells			
Net Area	215809.00 (7.38)	268213.33 (13.47)	24.28
Gross Area	273945.33 [7.83]	314885.33 (9.56)	14.94
Ordinary Wells(Sole irrigation)			
Net Area	1203718.33 (41.15)	843860.00 (42.38)	-29.90
Gross Area	1474393.67 [42.12]	953635.67 (28.95)	-35.32
Ordinary Wells (Supplementing other sources)			
Net Area	130907.00	74541.67 (3.74)	-43.06
Gross Area	147517.67	92780.67 (2.82)	-37.11
Other Sources (Spring Channels etc.)			
Net Area	18115.67 (0.62)	7326.33 (0.37)	-59.56
Gross Area	20208.33 [0.58]	8215.67 (0.25)	-59.35
Net area irrigated excluding wells supplementing other sources	2925081.67 (100.00)	2886267.33 (100.00)	-1.33
Area irrigated more than once	575283.33	408072.67	-29.07
Gross area of crops irrigated	3500365.00 [100.00]	3294340.00 [100.00]	-5.89

Figures in parentheses () indicate percentage of the respective total cropped area.

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to 2009-10,
Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Fig.4. Gross area irrigated by different sources of water supply in Tamil Nadu state
(in percentage)



Area under principal crops

The principal crops raised in Tamil Nadu State comprises of food crops like paddy, millets, pulses and oil seeds and non food crops like cotton and sugarcane. The total cropped area and gross production of principal crops depend upon the quantum and spread of precipitation and the availability of ground water.

The area under principal crops in Tamil Nadu State in the triennium ending 1998-99 and 2009-10 is provided in Table 8. It could be seen that the area under total food and non food crops had declined from 65.47 lakhs hectares in 1998-99 to 57.37 lakhs hectares in the triennium ending 2009-10 and it amounted to a decline of 12.37 per cent during the period under question.

As regards the area under total cereals, there had been a decline in area to the extent of 15.71 per cent during the period under question. With the exception of area under maize, the declining trend was observed in paddy, cholam, cumbu and ragi in the triennium ending 2009-10 as compared to the triennium ending 1998-99.

.Table 8. Area under Principal Crops in Tamil Nadu State (Area in ha)

Crop	Triennium ending		Percentage changes
	1998 - 99	2009- 10	
Paddy	2236400.33 (34.16)	1855442 (32.34)	-17.03
Cholam	380109.33 (5.81)	260292.7 (4.54)	-31.52
Cumbu	162392.33 (2.48)	56965.67 (0.99)	-64.92
Ragi	113545.00 (1.73)	88705 (1.55)	-21.88
Maize	54240.00 (0.83)	251408.7 (4.38)	363.51

Crop	Triennium ending		Percentage changes
	1998 - 99	2009- 10	
Total cereals	3022131.67 (46.16)	2547272 (44.40)	-15.71
Black gram	116096.00 (1.77)	276969.33 (4.83)	138.57
Green gram	72054.33 (1.10)	145142.3 (2.53)	101.43
Red gram	75551.67 (1.15)	28032.67 (0.49)	-62.90
Total pulses	603365.67 (9.22)	560410 (9.77)	-7.12
Total food grains	3625497.33 (55.37)	3107682.3 (54.17)	-14.28
Chillies	74692.33 (1.14)	63765.33 (1.11)	-14.63
Turmeric	19656.00 (0.30)	30181.33 (0.53)	53.55
Total spices	165308.67 (2.52)	145015.3 (2.53)	-12.28
Sugarcane	282867.00 (4.32)	318717 (5.56)	12.67
Banana	85400.67 (1.30)	114092.7 (1.99)	33.60
Mango	92709.00 (1.42)	130310 (2.27)	40.56
Guava	8599.67 (0.13)	7069.33 (0.12)	-17.80

Crop	Triennium ending		Percentage changes
	1998 - 99	2009– 10	
Grapes	2190.00 (0.03)	2561.67 (0.04)	16.97
Lemon	6685.33 (0.10)	7546.333 (0.13)	12.88
Total Fresh fruits	209012.67 (3.19)	282540.7 (4.92)	35.18
Total dry fruits	83088.00 (1.27)	99850.33 (1.74)	20.17
Total fruits & dry fruits	292100.67 (4.46)	388053 (6.76)	32.85
Potato	5122.67 (0.08)	4348 (0.08)	-15.12
Tapioca	88951.33 (1.36)	127680 (2.23)	43.54
Onion	27117.00 (0.41)	30362.67 (0.53)	11.97
Brinjal	8388.67 (0.13)	6839.33 (0.12)	-18.47
Lady's finger	4407.33 (0.07)	4710.33 (0.08)	6.87
Tomato	25910.00 (0.40)	23155.67 (0.40)	-10.63
Total Vegetables	190686.67 (2.91)	228822 (3.99)	20.00
Cotton	224727.33 (3.43)	205982 (3.59)	-8.34

Crop	Triennium ending		Percentage changes
	1998 - 99	2009- 10	
Groundnut	864468.67 (13.20)	479355.3 8.36	-44.55
Gingelly	91898.00 (1.40)	66915.33 (1.17)	-27.19
Coconut	267636.00 (4.09)	391087 (6.82)	46.13
Total edible oil	1268579.67 (19.38)	968702.67 (16.89)	-23.64
Total Non edible oil	27961.67 (0.43)	9332.67 (0.16)	-66.62
Fodder crops	190061.33 (2.90)	172587.67 (3.01)	-9.19
Green manure	5472.00 (0.08)	2582.67 (0.05)	-52.80
Total flowers	16653.00 (0.25)	25747.33 (0.45)	54.61
Total food crops	4564352.00 (69.71)	4200128.67 (73.21)	-7.98
Total non food crops	1982883.33 (30.29)	1536915.33 (26.79)	-22.49
Total food & non food crops	6547235.33 (100.00)	5737044.00 (100.00)	-12.37

Figures in parentheses () indicate percentage to total cropped area.

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to 2009-10,
Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Paddy occupied an area of 18.55 lakhs hectares in the triennium ending 2009-10 and it accounted for 32.34 per cent of the total cropped area under food and non-food crops. However, it exhibited a decline of 17.03 per cent during the period under question. Likewise, the area under cholam declined from 3.80 lakhs hectares in the triennium ending 1998-99 to 2.60 lakhs hectares in the triennium ending 2009-10 and the decline was 31.52 per cent. Similarly, the area under cumbu declined to the extent of 64.92 per cent over a period of ten years and it stood at 0.57 lakh hectares in the triennium ending 2009-10. The area under ragi accounted for 1.63 per cent of the total cropped in the State in the triennium ending 2009-10 and it witnessed a reduction of 21.88 per cent as compared to its area in the triennium ending 1997-98. It is interesting to note that the area under maize in the State increased significantly during the period under question. The area under maize increased from 0.54 lakh hectares in the triennium ending 1998-99 to 2.51 lakhs hectares in the triennium ending 2009-10 and the increase in area accounted for 363.51 per cent.

The area under total pulses accounted for 9.77 per cent of the total area under food and non-food crops in the State in the triennium ending 2009-10 and there had been a reduction in the area to the extent of 7.12 per cent as compared to the triennium ending 1998-99. Among the pulses, the reduction in the area was more pronounced in red gram (62.90 per cent). The area under black gram increased by 138.57 per cent as against green gram which exhibited an increase of 101.43 per cent only. Since there was a reduction of area under total cereals and total pulses in the triennium ending 2009-10, the area under total food grains had also exhibited a decline of 14.28 per cent in the aforesaid period.

Among the spices, the area under chillies declined from 0.75 lakh hectares in the triennium ending 1998-99 to 0.64 lakh hectares in the triennium ending 2009-10 and the reduction in area amounted to 14.63 per cent. On the other hand, the area under turmeric in the State showed an increase of 42.11 per cent during the period under question. However, the area under total spices witnessed a decline of 12.28 per cent in the triennium ending 2009-10.

The area under total fresh fruits accounted for 4.92 per cent of the total area under food and non-food crops in the State and it increased by 35.18 per cent. With the exception of guava, the area under banana, mango, grapes and lemon had increased considerably in the triennium ending 2009-10 as compared to the triennium ending 1998-99. The increase in area of fruits was more pronounced in mango as compared to the other fruits.

The area under dry fruits and total fresh and dry fruits exhibited an increase of 20.17 and 32.85 per cent in the triennium ending 2009-10 respectively.

The area under total vegetables was 2.28 lakhs hectares in the triennium ending 2009-10 and it increased from 1.91 lakhs hectares in the triennium ending 1998-99. Among the vegetables, with the exception of tapioca and onion, there was a reduction in the area in potato, brinjal, lady's finger and tomato in the triennium ending 2009-10. The reduction in area was more pronounced in brinjal (18.47 per cent). The area under tapioca and onion showed a decadal variation of 43.54 and 11.97 per cent respectively in the triennium ending 2009-10 in the State.

As regards the oil seeds, with the exception of coconut, the area under cultivation had reduced considerably in groundnut and gingelly in the State in the triennium ending 2009-10.

The area under groundnut was 4.79 lakhs hectares in the triennium ending 2009-10 and it reduced from 8.65 lakhs hectares in the triennium ending 1998-99. Similarly the area under gingelly reduced from 0.92 lakh hectares in 1998-99 to 0.67 lakh hectares in the triennium ending 2009-10. The reduction in the area under groundnut and gingelly was 44.55 and 27.19 per cent in the triennium ending 2009-10 respectively. On the contrary, the area under coconut had increased from 26.76 lakhs hectares in the triennium ending 1998-99 to 39.10 lakhs hectares in the triennium ending 2009-10.

While the area under sugarcane exhibited an increase of 27.34 per cent in the triennium ending 2009-10, the area under cotton declined to the extent of 8.34 per cent in the State in the triennium ending 2009-10.

In sum, there had been a decline in the area under food crops, non-food crops and total food and non-food crops in Tamil Nadu State in the triennium ending 2009-10 and the decline in area was more pronounced among the non-food crops as compared to the food crops.

Area of irrigated crops

The details of area of irrigated crops in Tamil Nadu State in the triennium ending 1998-99 and 2009-10 are furnished in Table 9.

Table 9. Area of irrigated Crops in Tamil Nadu State**(Area in Ha)**

Crop	Triennium ending		Percentage changes
	1998 – 99	2009 - 10	
Paddy	2083448.67 (58.41)	1724607.7 (52.35)	-17.22
Cholam	38789.67 (1.09)	22927.33 (0.70)	-40.89
Maize	28896.00 (0.81)	111882.7 (3.40)	287.19
Total cereals	2192260.67 (61.46)	1876380.3 (56.96)	-14.41
Blackgram	21389.33 (0.60)	20885.67 (0.63)	-2.35
Green gram	7614.33 (0.21)	5638.333 (0.17)	-25.95
Red gram	2032.67 (0.06)	1055.333 (0.03)	-48.08
Total pulses	37683.33 (1.06)	29896.67 (0.91)	-20.66
Total Food grains	2230942.33 (62.54)	1906277 (57.87)	-14.55
Chillies	38836.33 (1.09)	29513 (0.90)	-24.01
Turmeric	19689.00	30142	53.09

Crop	Triennium ending		Percentage changes
	1998 – 99	2009 - 10	
	(0.55)	(0.91)	
Total spices	62206.67 (1.74)	68723 (2.09)	10.48
Sugarcane	282853.67 (7.93)	318712 (9.67)	12.68
Onion	26163.67 (0.73)	2924.67 (8.88)	-88.82
Cotton	79412.00 (2.23)	139674 (4.24)	75.89
Groundnut	278341.67 (7.80)	176183.3 (5.35)	-36.70
Gingelly	34104.67 (0.96)	21941 (0.67)	-35.67
Coconut	20290.33 (5.69)	330677 (10.04)	1529.73
Total edible oil	529830.67 (14.85)	553811.3 (16.81)	4.53
Fodder crops	14835.67 (0.42)	18908 (0.57)	27.45
Total flowers	16860.00 (0.47)	25541.33 (0.78)	51.49
Total food crops	2818310.67 (79.01)	2610933.33 (79.26)	-7.36

Crop	Triennium ending		Percentage changes
	1998 – 99	2009 - 10	
Total Non-food crops	748721.00 (20.99)	683406.7 (20.74)	-8.72
Total food & non-food crops	3567031.67 (100.00)	3294340 (100.00)	-7.64

Figures in parentheses () indicate percentage to total cropped area.

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to 2009-10, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

It could be seen from the table that the irrigated area of total cereals in Tamil Nadu State had declined from 21.92 lakhs hectares in 1998-99 to 18.76 lakhs hectares in 2009-10 and the rate of decline was found to be 14.41 per cent. Among the total cereals, with the exception of maize in all the other cereals, the area under irrigation had considerably reduced in the triennium ending 2009-10 as compared to the triennium ending 1998-99 and the decline in area under irrigation was more pronounced in cumbu as compared to paddy, cholam and ragi. Though paddy accounted for 52.35 per cent of the total area irrigated under food and non-food crops in the triennium ending 2009-10, the irrigated area in paddy declined from 20.84 lakhs hectares in 1998-99 to 17.34 lakhs hectares in 2009-10. On the contrary, the area irrigated in maize had showed a decrease of 150.27 per cent in the triennium ending 2009-10.

As regards totals pulses, the area irrigated in the triennium ending exhibited a decline of 20.66 per cent as compared to the triennium ending 1998-99. The area irrigated in black gram, green gram and red gram declined considerably in the triennium ending 2009-10 and the decline was more pronounced in red gram (48.08 per cent) as compared to black gram (2.35 per cent). In green gram also, the area irrigated had decreased from 7,614 hectares in the triennium ending 1998-99 to 5638 hectares in the triennium ending 2009-10 and the decadal variation was found to be 25.95 per cent.

While the area irrigated in chillies had declined to the extent of 32.92 per cent in the triennium ending 2009-10, the area irrigated in turmeric had increased to the extent of 58.09 per cent in that

period as compared to the triennium ending 1998-99. Accordingly, the area irrigated in the case of total spices had witnessed a marginal decadal variation of 0.51 per cent.

Unlike that of irrigated area in cotton, the irrigated area in sugarcane had shown an increase of 12.68 per cent in the triennium ending 2009-10 as compared to the triennium ending 1998-99. On the contrary, the irrigated area in cotton had reduced drastically from 79,412.00 hectares in the triennium ending 1998-99 to 39,270.33 hectares in the triennium ending 2009-10.

With the exception of coconut, the irrigated area in groundnut and gingelly declined to the extent of 36.70 and 35.67 per cent respectively in the triennium ending 2009-10. However, the irrigated area in the total edible oils had shown a marginal increase of 4.53 in the triennium ending 2009-10 as compared to the triennium ending 1998-99.

The area irrigated of fodder crops and flowers had increased to the extent of 27.45 and 51.49 per cent respectively in the triennium ending 2009-10 in Tamil Nadu State.

In sum, the area irrigated of food crops, non-food crops and total food and non-food crops had declined to the extent of 7.36, 8.72 and 7.64 per cent respectively in the triennium ending 2009-10 as compared to the triennium ending 1998-99.

Yield of principal crops

The particulars of yield of principal crops in Tamil Nadu State in the triennium ending 1998-99 and 2009-10 are provided in Table 10.

It is heartening to note that the yield of paddy had reduced from 3.1 tons per hectare in the triennium ending 1998-99 to 2.85 tonnes in the triennium ending 2009-10. The decline in the yield rate was found to be 7.86 per cent.

With the exception of maize, the same phenomenon was observed in the yield of cholam, and ragi in the triennium ending 2009-10 and the decline was more pronounced in cholam wherein the rate of decline was found to be 9.97 per cent. On the contrary, a phenomenal increase in yield was observed in maize in the triennium ending 2009-10. Nearly 160 per cent increase in yield was observed in maize in the triennium ending 2009-10. Similarly, in cumbu also, the yield was increased by 17.41 per cent during the triennium ending 2009-10 over the triennium ending 1998-99.

Among the pulses, with the exception of red gram, reduction in yield was observed in green gram and black gram to the extent of 34.15 and 29.31 per cent respectively in the triennium ending 2009-10. On the contrary, in the case of red gram, the yield increased from 617.33 kg per hectare in the triennium ending 1998-99 to 691.33 kg per hectare in the triennium ending 2009-10 (11.99 per cent).

The yield of chillies and turmeric in Tamil Nadu State showed a decline of 7.66 and 4.34 per cent respectively over the triennium period from 1998-99 to 2009-10.

Among the vegetables all the major vegetables exhibited an increase in yield in the triennium ending 2009-10 as compared to the triennium ending 1998-99 with the exception of lady's finger which showed a decline of 13.16 per cent. The increase in yield was found to be high (36.85 per cent) in tomato.

It is interesting to note that the yield of all fresh fruits had increased considerably in the triennium ending 2009-10 and increase in yield was more pronounced in guava (82.70 per cent) as compared to other fruits. Likewise, the yield of cotton and sugarcane also increased in the triennium ending 2009-10 as compared to the triennium ending 1998-99 by 23.13 per cent whereas the yield of sugarcane had declined by 3.07 per cent during the same period .

Table 10. Yield of Principal Crops in Tamil Nadu State(kg/ha)

Crop	Triennium ending		Percentage Changes
	1998 – 99	2009 – 10	
Paddy	3100.00	2856.33	-7.86
Cholam	973.33	876.33	-9.97
Cumbu	1260.00	1479.33	17.41
Ragi	1916.67	1906.67	-0.52
Maize	1621.00	4226.00	160.70
Red gram	617.33	691.33	11.99
Green gram	436.33	287.33	-34.15
Black gram	450.33	318.33	-29.31
Sugarcane	108.33	105.00	-3.07
Chillies	557.00	514.33	-7.66
Turmeric	5639.67	5394.67	-4.34
Tapioca	35485.67	37714.00	6.28
Onion	8084.67	9613.67	18.91
Brinjal	10502.00	9120.33	-13.16
Lady's finger	7462.00	7432.00	-0.40
Tomato	9537.33	13051.67	36.85
Banana	42535.33	31726.67	-25.41
Mango	4929.67	5076.67	2.98
Lemon	1716.00	2902.33	69.13
Guava	7090.67	12954.33	82.70
Cotton	268.00	330.00	23.13

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to 2009-10, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Production of principal crops

The determinates of production are area and yield. The performance of the cropped area and yield could be visualized in the production performance of crops. The details of production of principal crops are furnished in Table 11.

Table 11. Production of Principal Crops in Tamil Nadu State

(in tonnes)

Crop	Triennium ending		Percentage Changes
	1998 – 99	2009 – 10	
Paddy total	6946776.67	5296199.00	-23.76
Maize	87890.00	1068688.33	1115.94
Cholam	379550.00	227744.00	-40.00
Cumbu	204313.33	84171.00	-58.80
Ragi	216360.00	168942.33	-21.92
Total cereals	7888323.33	6877086.33	-12.82
Redgram	47006.67	19551.33	-58.41
Greengram	49953.33	41740.67	-16.44
Blackgram	97973.33	87225.00	-10.97
Total pulses	260420.00	185674.33	-28.70
Total F.G	8148743.33	7062640.67	-13.33
Sugarcane	30707410	33542687.33	9.23
Chillies	41483.33	32746.00	-21.06
Turmeric	109580.00	162471.00	48.27
Tapioca	3171320.00	4845070.33	52.78
Onion	219560.00	291937.00	32.96
Brinjal	87776.67	62066.33	-29.29
Lady's finger	32773.33	35337.00	7.82
Tomato	247293.33	302229.00	22.21
Banana	3693840.00	5140266.67	39.16
Mango	496660.00	661072.00	33.10
Lemon	41160.00	21911.33	-46.77

Guava	68370.00	91594.67	33.97
Cotton	363993.33	204578.00	-43.80
Groundnut	1472033.33	972690.70	-33.92

Source: Season and Crop Report of Tamil Nadu, 1996-97 to 1998-99 and 2007-08 to

2009-10, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

It could be seen from the table that the production of paddy had declined to the extent of 19.10 per cent in the triennium ending 2009-10. Since the area under paddy and yield of paddy had declined considerably in Tamil Nadu State in the triennium ending 2009-10, there was a decline in the production of paddy. The same reason could be attributed to the reduction in the production of cholam, ragi and total cereals even though the yield of cumbu had increased, the decline in production was due to reduction in area. In the case of maize, the production had increased to the extent of tenfold due to area and yield effects.

Due to reduction in the area under pulses, the production had also decreased to the extent of 28.70 per cent in the triennium ending 2009-10. Among the pulses, the reduction of yield was more pronounced in green gram (34.15 per cent), followed by black gram (29.31 per cent). Though the yield of red gram in the triennium ending 2009-10 increased to the extent of 11.99 per cent, because of area effect (48.08 per cent decline), the production of red gram decreased to the extent of 58.41 per cent in the period under study. In sum, due to area and yield effect, the production of food grains had also decreased to the extent of 13.33 per cent.

The area and yield of chillies in Tamil Nadu State had declined in the triennium ending 2009-10, (20.63 per cent) (10.77 per cent), the production of chillies had declined to the extent of 12.70 per cent in the triennium ending 2009-10.

Due to declining area and yield effect, the production of brinjal declined to the extent of 29.29 per cent. However, in the case of onion, tapioca and tomato, the production had increased due to yield effect in the case of tomato and area and yield effect in the case of tapioca and onion. In the case of Lady's Finger the production had increased due to area effect.

With the exception of lemon, the production had increased in other fruits viz, banana, mango and guava, increased in the triennium ending 2009-10 and the production was more pronounced in the

case of banana. Though yield had increased in cotton, due to area effect, the production of cotton declined to the extent of 43.80 per cent in Tamil Nadu State in the triennium ending 2009-10. The same phenomenon holds true in the case of production reduction in groundnut and gingelly.

Agricultural Implements and Machinery

The details of agricultural implements and machinery in Tamil Nadu State are furnished in Table 12.

Table 12. Agricultural Implements and Machinery in Tamil Nadu State

(in numbers)

SI.NO	Particulars	Number	
I	Manually operated Implements		
	i) Seed cum fertilizer drill	14546	
	ii) Inter culture Equipments	45847	
	iii) Rice planter	3597	
	iv) Thresher	7692	
II	Animal operated Implements		
	i) Winnower	67538	
	ii) Wooden plough	755183	
	iii) Steel plough	337147	
	iv) Cultivator	61013	
	v) Disc Harrow	20269	
	vi) Seed fertilizer drill	6353	
	vii) Leveller	155046	
	viii) Wetland puddler	55375	
	ix) Sugarcane Crusher	6550	
	x) Cart	155857	

SI.NO	Particulars	Number	
	xi) Ghanis	6963	
III	Plant Protection Equipments / Sprayers / Dusters operated by		
	i) Manual	79072	
	ii) Power	42685	
	iii) Tractor	2385	
	iv) Manual	6136	
	v) Animal	6689	
IV	Irrigation Equipments		
	i) Diesel Engine	237031	
	ii) Electric Pump	789246	
	iii) Drip	44993	
	iv) Sprinkler	42723	
V	Tractor and other power operated Implements		
	i) Agricultural power tillers	10217	
	ii) Agricultural tractors	492828	
	iii) Crawler tractor	17178	
	iv) Mould board plough	14297	
	v) Cultivator	28316	
	vi) Disc harrow	20208	
	vii) Rotavator	14170	
	viii) Seed fertilizer Drill	16636	
	ix) Planter	808	
	x) Potato dugger	7286	

SI.NO	Particulars	Number	
	xi) Combine Harvester	3861	
	xii) Trailers	12010	
	xiii) Power operated Thresher	4041	
	xiv) Maize Sheller	773	
	xv) Sugarcane Crusher	1407	
	xvi) Reapers	69370	
	xvii) Rice planter	23445	
VI	Equipments for Livestock and Poultry		
	i) Incubators / Breeders	22274	
	ii) Milking machine	22274	
	iii) Hay harvesting machine	270913	
	iv) Stationary balls	66606	
	v) Chaff cutter	279060	
VII	Horticultural Tools		
	i) Hand tools	18838636	
	ii) Power operated tools	320273	

Source: 17th Quinquennial Livestock Census-2004 Department of Veterinary Sciences and Department of Animal Husbandry, Chennai-6.

It could be seen from the table that a variety of agricultural machinery and implements are available to meet the requirements of farming community. Among the manually operated implements, interculture equipments topped the list numbering more than 45,000. Among the animal operated implements, wooden plough and steel ploughs were the major implements. Manual operated plant protection equipments occupied a predominant place in plant protection equipments. Among the water lifting devices, electric pumpsets topped the list followed by diesel engine, drip irrigation devices and

sprinkler devices in that order. Reapers and Wheeled tractors were the most important implements among the tractor and other power operated implements. Hay harvesting machines numbering 2.70 lakhs were the most important machinery among the equipments for livestock and poultry. Hand tools were mostly preferred among the horticultural tools.

The manual operated implements were available in large numbers in Kancheepuram district. Likewise animal operated implements were more common in Villupuram district as compared to other districts. Plant protection equipments were available in large numbers in Vellore district. Villupuram district had more number of Diesel engines and Electric pumpsets as compared to other districts. Villupuram district had more number of equipments for livestock and poultry.

Livestock population

The details of livestock population in Tamil Nadu State are furnished in Table 13.

Table 13. Livestock and Poultry population in Tamil Nadu State

(in numbers)

Sl.No	Particulars of Livestock	2004	1997	Percentage change
1	Cattle	9141043	9046542	1.04
2	Buffaloes	1650343	2741263	-39.79
3	Sheep	5593485	5258884	6.36
4	Goat	8177420	6416204	27.44
5	Pigs	320868	609176	-47.32
6	Horses and pomes	24988	11003	127.10
7	Donkeys	25779	43197	-40.32
8	Dogs	2716631	1796216	51.24
9	Fowls	86119929	35792376	140.60
10	Poultry	86591273	36511075	137.16

Source: 16th Quinquennial Livestock Census-1997 and 17th Quinquennial Livestock Census-2004
Department of Veterinary Science and Department of Animal Husbandry-Chennai-6.

It could be seen that there had been a marginal increase of cattle population in 2004 as compared to 1997. On the contrary, the population of buffaloes had reduced from 27.41 lakhs in 1997 to 16.50 lakhs in 2004 and the decline of population amounted to 39.79 per cent. The population of sheep and goats had increased to the extent of 6.36 and 27.44 per cent respectively during the period under question. On the contrary, the population of pigs and donkeys had declined to the extent 47.32 and 40.32 per cent respectively in Tamil Nadu State during the period under consideration.

There had been 127.10 per cent increase in the population of horses and pomes. Likewise the population of poultry increased from 36.51 crores in 1997 to 86.59 crores in 2004 and it accounted for an increase of 137.16 per cent. The reduction of cattle and buffaloes populations could be attributed to the shift from animal power to machine power in the agricultural operation and scarcity of fodder as well. The increase in poultry population could be attributed to facilities available to the farmers for establishment of poultry units. However, encouragement for backyard poultry as well is required to increase the income of the farm households.

Size of Holdings

The distribution of size of holdings in Tamil Nadu State over years is furnished in Table 14.

It could be seen from the table that the average size of marginal holdings had declined from 0.41 hectare in 1976-77 to 0.37 hectare in 2000-01. The average size of small holdings had remained almost the same during the period under consideration. As regards the semi-medium holdings, the average size declined from 2.75 hectares in 1976-77 to 2.72 hectares in 2000-01. Similarly the average size of medium holdings also reduced from 5.77 hectares in 1976-77 to 5.68 hectares in 2000-01. On the contrary, the size of large holdings had increased from 17.28 hectares in 1976-77 to 19.48 hectares in 2000-01. In sum, the average size of holding

in Tamil Nadu State had decreased from 1.25 hectares in 1976-77 to 0.89 hectare in 2000-01.

Table 14. Farm Size Group wise Distribution and Average Size of Holdings in Tamil Nadu State

Sl.No.	Categories	1976-77	1979-80	1985-86	1990-91	1995-96	2000-01	
1	Marginal	0.41	0.38	0.37	0.36	0.38	0.37	
2	Small	1.41	1.41	1.41	1.41	1.41	1.40	
3	Semi-medium	2.75	2.76	2.74	2.73	2.73	2.72	
4	Medium	5.77	5.78	5.78	5.72	5.60	5.68	
5	Large	17.28	17.96	18.78	18.44	21.68	19.48	
	Average	1.25	1.07	1.01	0.93	0.95	0.89	

Source: Annual Statistical Abstract of Tamil Nadu, 2005-06, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Demographic Details

The demographic details of Tamil Nadu State as per 2001 and 2011 census are furnished in Table 15. It could be seen from the table that there were 16,317 villages in Tamil Nadu State and of them 94.14 per cent of the villages were inhabited villages and 917 villages remain uninhabited. As per 2001 Census, there were 832 towns in Tamil Nadu State.

The total population of Tamil Nadu State as per 2001 census was 6.24 crores and the males accounted for 50.3 per cent of the total population and females constituted 49.7 per cent of the total population. The percentage of rural and urban population was 56.0 and 44.0 respectively. The decadal population growth (1991-2001) was found to be 11.7 per cent. As per 2001 census, there were 480 persons per square kilometers and there were 987 females per 1000 males in Tamil Nadu State. The sex ratios in rural and urban areas were found to be 992 and 982 respectively.

Table 15. Demographic Details of Tamil Nadu State-2001

S.No	Particulars	Number	Percentage
1	Number of village		
	Total	16,317	100.00
	Inhabited	15,400	94.4
	Uninhabited	917	5.60
2	Number of Towns		
	Statutory	721	86.7
	Census towns	111	13.3
	Total	832	100.0
3	Total population		
	Persons	62,405,679	100.0
	Males	31,400,909	50.3
	Females	31,094,770	49.7
4	Rural		
	Persons	34,921,681	100.0
	Males	17,531,494	50.2
	Females	17,390,187	49.8
5	Urban		
	Persons	27,483,998	100.0
	Males	13,869,415	50.5
	Females	13,614,583	49.5
6	Decadal population growth (1991-2001)		
	Persons	6,546,733	11.7
	Males	3,101,934	11.0
	Females	3,444,799	12.5
7	Density of population	480	
8	Sex ratio		
	Total	987	
	Rural	992	
	Urban	982	
9	Literates		
	Persons	40,524,545	73.5
	Males	22,809,662	82.4
	Females	17,714,883	64.4
10	Scheduled caste population		
	Persons	11,857,504	19.0
	Males	5,932,925	18.9
	Females	5,924,579	19.1
11	Scheduled Tribe population		
	Persons	651,321	1.0
	Males	328,917	1.0
	Females	322,404	1.0

12	Workers and non- workers		
	Total workers		
	Persons	27,878,282	44.7
	Males	18,100,397	57.6
	Females	9,777,885	31.5
	Main workers		
	Persons	23,757,783	38.1
	Males	16,303,310	51.9
	Females	7,454,473	24.0
	Marginal workers		
	Persons	4,120,499	6.6
	Males	1,797,087	5.7
	Females	2,323,412	7.5
	Non workers		
	Persons	34,527,397	55.3
	Males	13,300,512	42.4
	Females	21,226,885	68.7
13	Category of workers (Main and Marginal)		
	Cultivators		
	Persons	5116039	18.4
	Males	3,262,480	18.0
	Females	1,853,550	19.0
	Agricultural labourers		
	Persons	8,637,630	31.0
	Males	4,256,360	22.5
	Females	4,381,270	44.8
	Workers in household activities		
	Persons	1,499,761	5.4
	Males	648,589	3.6
	Females	851,172	8.7
	Other workers		
	Persons	12,624,852	45.3
	Males	9,932,959	54.9
	Females	2,691,893	27.5

Source: Annual Statistical Abstract, 1991 and 2001, 2012 Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

The literacy rate in Tamil Nadu State was 73.5 per cent and the literacy rate was found to be high among males (82.4 per cent) as compared to females (64.4 per cent).

In all 44.7 per cent of the population were found to be the workers and it varied from 31.5 per cent among females to 57.6 per cent among males. The main workers accounted for 38.1 per cent of the total population and the percentage of main workers varied from 24.0 among females to 51.9 among males. The marginal workers accounted for 6.6 per cent of the total population and the marginal workers ranged from 5.7 per cent among males to 7.5 per cent among females.

Category wise workers indicated that cultivators accounted for 18.4 per cent of total workers in the State. Regarding sex wise details it could be seen that there were 18.0 per cent male cultivators and 19.0 per cent female cultivators. Further 31.0 per cent of the total workers were found to be agricultural labourers and the agricultural labourers were found to be high among females (44.8 per cent) than among males (23.5 per cent). Nearly 5.4 per cent of the total workers were found to be engaged in household activities and other workers accounted for 45.3 per cent of the total workers in Tamil Nadu State as per 2001 census.

Decadal variation of workers

The decadal variation of workers in Tamil Nadu State is furnished in Table 16.

It could be seen there had been a decadal variation of 15.22 per cent in the quantum of workers available in Tamil Nadu State as per 2001 census. The main workers increased from 2.28 crores in 1991 to 2.37 crores in 2001 and it accounted for a decadal variation of 4.22 per cent. Similarly, the non-workers had also increased from 3.16 crores in 1991 to 3.45 crores in 2001 registering an increase of 9.09 per cent over a period of decade concerted efforts have to be taken up, to arrest this increasing trend of non-workers.

Table 16. Decadal variation of workers in Tamil Nadu State

Sl.No.	Categories of workers	1991	2001	Per cent change
1	Total workers	24194343	27878282	15.22
2	Main workers	22799066	23757781	4.20
3	Marginal workers	1395277	4120499	195.22
4	Non workers	31664603	34527397	9.09

Source: Annual Statistical Abstract, 1991 and 2001, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Production of Dry Land Crops – Status in Tamil Nadu

In Tamil Nadu, millets such as sorghum, pearl millet, ragi, maize, and minor millets which include Korra, Varagu, Samai, Kudhiraivali and panivaragu; pulses, viz., black gram, green gram, red gram, bengal gram, horse gram, mochai, cow pea, avarai and nari payaru; spices, viz., chillies, coriander and tamarind; fruit crops, viz., mango, jack, guava, citrus fruits and cashew nut; vegetable crops, viz., potato and tapioca; cotton; oilseeds, viz., ground nut, gingelly, coconut, sun flower and castor; and other crops, viz., eucalyptus, casurina and teak are largely grown in dry lands.

As indicated earlier, the Government of Tamil Nadu took up several measures to improve the productivity of rainfed crops. Although many crops are raised under rainfed condition, crops like sorghum (Jowar), pearl millet (Bajra), ragi, maize, redgram, black gram, green gram, ground nut, gingelly and cotton are largely cultivated under unirrigated condition.

In Tamil Nadu, the average unirrigated area during the last 10 year – period (2000-01 to 2009-10) constituted 45.4 per cent of the total cropped area (Table 2). The Compound Growth Rate (CGR) for the total unirrigated area would show a negative trend during this period, i.e., 1.96 per cent per annum, although there was a marginal increase in the CGR of irrigated area in the state (0.80 per cent per annum). The decline in unirrigated area coupled with the rise in irrigated area could be viewed as a positive sign, but this off set by the decline in the CGR for the total cropped area (i.e., -0.46 per cent)

Among the dry land crops, ground nut had a major share of 14.6 per cent of the average total unirrigated area for the period from 2000-01 to 2009-10 in the state and it was followed by jowar (10.9 per cent), black gram (8.5 per cent), green gram (4.8 per cent), maize (4.2 per cent) and so on (Table 2).

It could be observed that the unirrigated area under bajra showed a larger decline (-11.3 per cent) during the period from 2000-01 to 2009-10 and it was followed by red gram (-10.5 per cent), ground nut (-5.7 per cent), jowar (-3.6 per cent), gingelly (-3.5 per cent) and so on. However, there was a significant increase in the area under unirrigated maize (13.8 per cent), green gram (2.5 per cent) and black gram (2.4 per cent).

As regards the productivity of dry land crops, there was a perceptible increase in the CGR of yield all crops excepting green gram (-5.1 per cent) and black gram (-3.0 per cent). Another point of concern was the yield difference between irrigated and unirrigated crops.

Table 17. Changes in Area, Production and Productivity of Dry Land Crops during X and XI Plan Periods

Crops	Area		Production		Productivity	
	Positive Change between X and XI Plan	Negative Change between X and XI Plan	Positive Change between X and XI Plan	Negative Change between X and XI Plan	Positive Change between X and XI Plan	Negative Change between X and XI Plan
Jowar	Virudhunagar Thoothukudi Cuddalore,	Erode, Thiruvallur Pudukkottai	Thoothukudi, Krishnagiri, Virudhu-nagar	Erode, Pudukkott-ai, Thiruvallur	Thoothukudi Krishnagiri, Perambalur	Coimbatore Trichy, Dindigul
Bajra	Sivaganga Cuddalore, Krishnagiri	Pudukkott-ai, Perambalur Kancheepuram	Sivaganga Cuddalore, Vellore	Pudukkott-ai, Perambalur, Kancheepuram	Cuddalore, Perambalur Vellore	Dharmapuri, Virudhunagar Thiruvallur
Ragi	Cuddalore, Karur, Coimbatore	Perambalur, Kancheepuram, Pudukkottai	Tirunelveli, Dindigul Cuddalore	Sivaganga Thoothukudi Perambalur	Krishnagiri, T.V.Malai, Vellore	Coimbatore Erode Namakkal

Table 18: Average Area, Production and Productivity of Crops Grown under Unirrigated Condition in Tamil Nadu during 2000-01 to 2009-10

S. No.	Crops	Area (Ha)		% to Total Unirrigated Area in Tamil Nadu	Production (Tonnes)		Productivity (Kgs / Ha)	
		Unirrigated Area	% to Total Area under the Crop		Unirrigated	% to Total Production of the Crop	Unirrigated	% age of Productivity under Unirrigated Crop to Productivity under Irrigated Crop
1.	Jowar	2,87,215 (-3.55)	91.53	10.89	2,08,568 (-1.84)	83.49	737 (1.71)	47.61
2.	Bajra	84,712 (-11.27)	90.97	3.21	95,870 (-7.18)	83.01	1174 (4.09)	49.87
3.	Ragi	86,156 (-2.45)	82.48	3.27	1,27,239 (-0.51)	72.60	1484 (1.94)	56.41
4.	Maize	1,09,681 (13.82)	61.61	4.16	5,20,213* (27.71)	-	2575* (13.64)	-
5.	Total Cereals	7,54,553 (-1.96)	29.17	28.62	64,56,539 (1.45)	-	-	-
6.	Black Gram	2,22,962 (2.35)	91.07	8.46	94,978* (-1.45)	-	390* (-2.96)	-
7.	Green Gram	1,26,400 (2.53)	93.21	4.79	52,666* (-3.29)	-	392* (-5.11)	-
8.	Red Gram	39,947 (-10.53)	97.36	1.51	26,679* (-9.27)	-	653* (1.06)	-
9.	Total Pulses	5,44,327 (-1.85)	93.75	20.64	2,22,550 (-4.06)	-	-	-
10.	Ground nut	3,84,421 (-5.71)	68.20	14.58	5,28,740 (-3.80)	51.48	1380 (1.90)	49.54
11.	Gingelly	47,988 (-3.48)	65.97	1.82	17,246 (-2.49)	48.85	361 (0.99)	51.50
12.	Cotton	73,394 (-1.96)	63.01	2.78	95,217@ (4.84)	49.05	217\$ (6.80)	54.99
13	Total	26,36,779 (-1.96)	45.42	100.00	-	-	-	-

Figures in parentheses indicate the annual compound growth rate for the period from 2000-01 to 2009-10.

*Production and productivity are available only for total cropped area; @Bales of 170 kgs of lint each; \$ in terms of lint
Source: Season and Crop Report for different years.

As could be seen from the above table, the percentage of productivity under unirrigated crop to that of irrigated condition ranged between 47.6 per cent in jowar to 56.4 per cent in ragi. Therefore, there existed high potential to enhance productivities of these dry land crops.

Soil and water conservation techniques need to be taken to increase the proportion of irrigated to total cropped area from the present level of 54.6 per cent.

The area under current fallow, other fallow and culturable waste lands in Tamil Nadu during 2009-10 accounted for 8.6, 11.8 and 2.5 per cent respectively and therefore, efforts need to be taken up to bring these fallow lands under cultivation. Efforts are already being taken up to bring land area distributed under 'Two-acres land distribution scheme' so as improve their productivity.

The latest available data on area, production and productivity of different dry land crops for the third year of eleventh plan (i.e., 2009-10) have been compared with that of the last year of tenth plan, i.e., 2006-07 and the results are indicated in Table 3.

As could be seen from the table, there has been a larger decline in the unirrigated area under groundnut (-26.8 per cent) between 2006-07 and 2009-10 and it was followed by jowar (-22.4 per cent), bajra (-19.8 per cent), ragi (-13.7 per cent) and so on. However, the unirrigated area under cotton has shown a positive trend (19.9 per cent) during the same period and it was followed by gingelly (7.1 per cent).

As far as production of dry land crops was concerned, there was a major down fall in case of green gram (-38.4 per cent), jowar (-31.4 per cent), black gram (-31.0 per cent), ground nut (-28.3 per cent) and so on. The reduction in production was due to yield loss as in the case of green gram (-40.2 per cent) and gingelly (-12.0 per cent). The decline in production was due to reduction in area alone as in the case of red gram (-9.2 per cent). In case of jowar, bajra, black gram and ground nut, the production decline was caused by the reduction in both area and yield as could be seen in Table 3. As the decline in production was to the extent of one – third in case of green gram, jowar, black gram and groundnut, which was quite significant, urgent attention need to be bestowed on arresting the fall in production of these dry land crops.

Table 19: Changes in Area, Production and Productivity of Different Dry Land Crops under Unirrigated Conditions between Tenth and Eleventh Plan Periods in Tamil Nadu

S. No.	Crop	Area (Ha)			Production (Tonnes)			Productivity (Kgs / Ha)		
		Last Year of Tenth Plan (2006-07)	Third Year the Eleventh Plan (2009-10)	Percentage Change	Last Year of Tenth Plan (2006-07)	Third Year of Eleventh Plan (2009-10)	Percentage Change	Last Year of Tenth Plan (2006-07)	Third Year of Eleventh Plan (2009-10)	Percentage Change
1.	Jowar	275590	214009	-22.35	258952	177730	-31.37	940	830	-11.70
2.	Bajra	60304	48378	-19.78	85274	66712	-21.77	1414	1379	-2.48
3.	Ragi	83653	72160	-13.74	113970	128504	12.75	1362	1781	30.76
4.	Maize*	129597	134779	4.00	759112	1138126	49.93	3838	4661	21.44
5.	Total Cereals*	729700	636140	-12.82	7972250	7300179	-8.43	-	-	-
6.	Black Gram*	239163	235940	-1.35	143053	98712	-31.00	570	380	-33.33
7.	Green Gram*	127772	132513	3.71	77404	47673	-38.41	577	345	-40.21
8.	Red Gram*	28306	25717	-9.15	21334	20274	-4.97	732	765	4.51
9.	Total Pulses*	515029	503186	-2.30	290503	204369	-29.65	-	-	-
10.	Ground nut	351331	257043	-26.84	514703	368983	-28.31	1465	1435	-2.05
11.	Gingelly	37243	39890	7.11	16140	15166	-6.03	433	381	-12.01
12.	Cotton	61965	74277	19.87	116975@	145406@	24.31	321\$	333\$	3.74
13.	Total Cropped Area	2533507	2333476	-1.96	-	-	-	-	-	-

*Production and productivity are available only for total cropped area; @Bales of 170 kgs of lint each; \$ in terms of lint.

Table 20: Growth Rates of Area, Production and Productivity of Jowar under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year/Particulars	Area (Ha)			Production (Tonnes)			Productivity (Kgs /ha)		
	Irriga- ted	Unirri- gated	Total	Irriga- ted	Unirri- gated	Total	Irriga- ted	Unirri- gated	Combined
2000-01	39867	291482	331349	69150	236870	306020	1734	812	923
2001-02	31874	285359	317233	53830	221010	274840	1689	774	866
2002-03	26948	292659	319607	37906	172887	210793	1407	591	660
2003-04	19944	381663	401607	22669	223264	245933	1137	585	612
2004-05	29889	346850	376739	32762	219301	252063	1096	632	669
2005-06	29818	286456	316274	42385	189064	231449	1422	660	732
2006-07	18786	275590	294376	34988	258952	293940	1863	940	999
2007-08	18787	264739	283526	28557	219279	247836	1520	828	874
2008-09	25528	233348	258876	46112	167324	213436	1806	717	824
2009-10	24467	214009	238476	44230	177730	221960	1808	830	931
Average	26591	287215	313806	41259	208568	249827	1548	737	809
Percentage share to total	8.47	91.53	100.00	16.51	83.49	100.00	-	47.60*	-
Percentage Change between 2006-07 and 2009-10	30.24	-22.35	-18.99	26.41	-31.37	-24.49	-2.95	-11.70	-6.81
Annual Compound Growth Rate (%)	-4.81	-3.55	-3.69	-3.01	-1.84	-2.06	1.80	1.71	1.63

* Percentage share of yield under unirrigated to that of irrigated crop.

Table 21: Growth Rates of Area, Production and Productivity of Bajra under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year/Particulars	Area (Ha)			Production (Tonnes)			Productivity (Kgs /ha)		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Combined
2000-01	16407	112849	129256	40700	129670	170370	2480	1149	1318
2001-02	14768	110325	125093	35830	117140	152970	2426	1062	1223
2002-03	9641	92379	102020	17720	70962	88682	1838	768	869
2003-04	7338	151513	158851	9744	162597	172341	1328	1073	1085
2004-05	7359	90249	97608	19681	104619	124300	2674	1159	1273
2005-06	6873	75052	81925	14882	79917	94799	2165	1065	1157
2006-07	5208	60304	65512	13695	85274	98969	2629	1414	1511
2007-08	4132	55666	59798	10872	74968	85840	2631	1347	1436
2008-09	6270	50402	56672	17176	66845	84021	2739	1326	1483
2009-10	6049	48378	54427	15940	66712	82652	2635	1379	1519
Average	8405	84712	93116	19624	95870	115494	2355	1174	1287
Percentage share to total	9.03	90.97	100.00	16.99	83.01	100.00	-	49.87*	-
Percentage Change between 2006-07 and 2009-10	16.15	-19.78	-16.92	16.39	-21.77	-16.49	0.23	-2.48	0.53
Annual Compound Growth Rate (%)	-12.31	-11.27	-11.41	-9.26	-7.18	-7.76	3.05	4.09	3.65

* Percentage share of yield under unirrigated to that of irrigated crop.

Table 22: Growth Rates of Area, Production and Productivity of Ragi under Irrigated and Unirrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Area (Ha)			Production (Tonnes)			Productivity (Kgs /ha)		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Combined
2000-01	34460	92495	126955	99480	160010	259490	2886	1729	2043
2001-02	31696	93262	124958	87690	147620	235310	2767	1583	1883
2002-03	22367	81919	104286	47857	92312	140169	2140	1127	1344
2003-04	20700	97739	118439	49275	127106	176381	2380	1300	1489
2004-05	14548	94297	108845	33385	120700	154085	2295	1280	1416
2005-06	13608	85941	99549	29480	102692	132172	2166	1192	1325
2006-07	11825	83653	95478	34178	113970	148148	2890	1362	1552
2007-08	11541	82160	93701	31548	144396	175944	2734	1757	1878
2008-09	12146	77933	90079	34860	135084	169944	2870	1733	1887
2009-10	10175	72160	82335	32435	128504	160939	3188	1781	1955
Average	18307	86156	104463	48019	127239	175258	2632	1484	1677
Percentage share to total	17.52	82.48	100.00	27.40	72.60	100.00	-	56.41*	-
Percentage Change between 2006-07 and 2009-10	-13.95	-13.74	-13.77	-5.10	12.75	8.63	10.31	30.76	25.97
Annual Compound Growth Rate (%)	-13.79	-2.45	-4.52	-12.03	-0.51	-3.70	1.76	1.93	0.82

* Percentage share of yield under unirrigated to that of irrigated crop.

Table23: Growth Rates of Area, Production and Productivity of Maize and Total Cereals under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Maize						Total Cereals			
	Area (Ha)			Production (Tonnes)	Productivity (Kgs /ha)	Area (Ha)		Total	Production (Tonnes)	Productivity (Kgs /ha)
	Irrigated	Unirrigated	Total			Irrigated	Unirrigated			
2000-01	39034	42433	81467	139916	1717	2067283	745574	2812857	8304140	-
2001-02	33158	39798	72956	118463	1624	2032683	733486	2766169	7418142	-
2002-03	41497	79560	121057	191646	1583	1475835	753157	2228992	4259878	-
2003-04	48292	111867	160159	250992	1567	1358450	941947	2300397	4110967	-
2004-05	57835	132058	189893	294717	1552	1842065	854490	2696555	5929613	-
2005-06	59911	142919	202830	241217	1189	2016899	774501	2791400	5939142	-
2006-07	68185	129597	197782	759112	3838	1899911	729700	2629611	7972250	-
2007-08	88857	134571	223428	810057	3626	1783048	704939	2487987	6396715	-
2008-09	137411	149228	286639	1257882	4388	1983928	671597	2655525	6934365	-
2009-10	109380	134779	244159	1138126	4661	1862165	636140	2498305	7300179	-
Average	68356	109681	178037	520213	2575	1832227	754553	2586780	6456539	-
Percentage share to total	38.39	61.61	100.00	-	-	70.83	29.17	100.00	-	-
Percentage Change between 2006-07 and 2009-10	60.42	4.00	23.45	49.93	21.44	-1.99	-12.82	-4.99	-8.43	-
Compound Growth Rate (%)	14.61	13.82	14.07	27.71	13.64	0.56	-1.96	-0.22	1.45	-

Table 24: Growth Rates of Area, Production and Productivity of Black Gram and Green Gram under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Black Gram						Green gram					
	Area (Ha)			Production (Tonnes)	Productivity (Kgs/ha)	Total	Area (Ha)		Production (Tonnes)	Productivity (Kgs/ha)	Total	
	Irrigated	Unirrigated	Total				Irrigated	Unirrigated				
2000-01	38663	236971	275634	132500	480	127439	11355	116084	61550	483	127439	
2001-02	32477	233646	266123	104320	392	128995	9064	119931	53470	415	128995	
2002-03	24556	172332	196888	78555	399	112812	8163	104649	48053	426	112812	
2003-04	21038	164698	185736	75920	409	125690	16078	109612	53315	424	125690	
2004-05	14002	212362	226364	82998	367	154959	13318	141641	61760	399	154959	
2005-06	13247	202201	215448	70758	328	136699	10899	125800	45881	336	136699	
2006-07	11851	239163	251014	143053	570	134071	6299	127772	77404	577	134071	
2007-08	17007	290508	307515	79980	260	158691	6567	152124	46213	291	158691	
2008-09	21868	241803	263671	82983	315	138598	4723	133875	31336	226	138598	
2009-10	23782	235940	259722	98712	380	138138	5625	132513	47673	345	138138	
Average	21849	222962	244812	94978	390	135609	9209	126400	52666	392	135609	
Percentage share to total	8.92	91.08	100.00	-	-	100.00	6.79	93.21	-	-	100.00	
Percentage Change between 2006-07 and 2009-10	100.68	-1.35	3.47	-31.00	-33.33	3.03	-10.70	3.71	-38.41	-40.21	3.03	
Compound Growth Rate (%)	-6.52	2.35	1.51	-1.45	-2.96	1.82	-9.08	2.53	-3.29	-5.11	1.82	

Table 25: Growth Rates of Area, Production and Productivity of Red Gram and Total Pulses under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Red Gram					Total Pulses				
	Area (Ha)			Production (Tonnes)	Productivity (Kgs /ha)	Area (Ha)			Production (Tonnes)	
	Irrigated	Unirrigated	Total			Irrigated	Unirrigated	Total		
2000-01	1957	61297	63254	45060	712	60344	627587	687931	312643	
2001-02	1419	62194	63613	41420	651	51370	634033	685403	270719	
2002-03	627	43500	44127	24067	545	37389	525594	562983	200479	
2003-04	781	44133	44914	27475	612	41998	494851	536849	201056	
2004-05	878	42538	43416	28979	667	31818	558432	590250	216431	
2005-06	1199	36570	37769	20400	540	29032	496205	525237	177003	
2006-07	821	28306	29127	21334	732	21500	515029	536529	290503	
2007-08	1005	29052	30057	21077	701	26490	583062	609552	184924	
2008-09	1320	26163	27483	16703	608	30567	505292	535859	167370	
2009-10	841	25717	26558	20274	765	32633	503186	535819	204369	
Average	1085	39947	41032	26679	653	36314	544327	580641	222550	
Percentage share to total	2.64	97.36	100.00	-	-	6.25	93.75	100.00	-	
Percentage Change between 2006-07 and 2009-10	2.44	-9.15	-8.82	-4.97	4.51	51.78	-2.30	-0.13	-29.65	
Compound Growth Rate (%)	-3.20	-10.53	-10.33	-9.27	1.06	-7.87	-1.85	-2.24	-4.06	

Table 26: Growth Rates of Area, Production and Productivity of Ground nut under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Area (Ha)			Production (Tonnes)			Productivity (Kgs /ha)		
	Irriga- ted	Unirri- gated	Total	Irriga- ted	Unirriga- ted	Total	Irriga- ted	Unirri- gated	Combined
2000-01	210707	488682	699389	638610	719830	1358440	3030	1473	1942
2001-02	181190	481792	662982	571020	678610	1249630	3151	1408	1885
2002-03	156604	345486	502090	351977	365426	717403	2248	1058	1429
2003-04	171711	419985	591696	411898	506343	918241	2399	1206	1552
2004-05	197590	418287	615877	492615	512727	1005342	2493	1226	1632
2005-06	189705	429130	618835	502757	594835	1097592	2654	1386	1775
2006-07	156701	351331	508032	491772	514703	1006475	3138	1465	1981
2007-08	193595	341616	535211	495533	552053	1047586	2560	1616	1957
2008-09	178987	310857	489844	500881	473887	974768	2798	1524	1990
2009-10	155968	257043	413011	526735	368983	895718	3377	1435	2169
Average	179276	384421	563697	498380	528740	1027120	2785	1380	1831
Percentage share to total	31.80	68.20	100.00	48.52	51.48	100.00	-	49.54*	-
Percentage Change between 2006-07 and 2009-10	-0.47	-26.84	-18.70	7.11	-28.31	-11.00	7.62	-2.05	9.49
Annual Compound Growth Rate (%)	-1.24	-5.71	-4.24	-0.24	-3.80	-1.96	1.01	1.90	2.28

* Percentage share of yield under unirrigated to that of irrigated crop.

Table 27: Growth Rates of Area, Production and Productivity of Gingelly under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Area (Ha)			Production (Tonnes)			Productivity (Kgs /ha)		
	Irriga- ted	Unirri- gated	Total	Irriga- ted	Unirriga- ted	Total	Irriga- ted	Unirri- gated	Combined
2000-01	46458	57530	103988	43430	21180	64610	934	368	621
2001-02	27435	56413	83848	23830	22160	45990	869	393	548
2002-03	23331	41150	64481	15261	12786	28047	654	311	435
2003-04	19817	64018	83835	8631	20373	29004	436	318	346
2004-05	27564	45161	72725	19473	14367	33840	706	318	465
2005-06	21678	43440	65118	14424	16348	30772	665	371	469
2006-07	15381	37243	52624	11188	16140	27328	727	433	519
2007-08	21543	52833	74376	14567	17634	32201	676	334	433
2008-09	21493	42200	63693	15934	16308	32242	741	386	506
2009-10	22787	39890	62677	13855	15166	29021	608	381	463
Average	24749	47988	72737	18059	17246	35305	702	361	481
Percentage share to total	34.03	65.97	100.00	51.15	48.85	100.00	-	51.50*	-
Percentage Change between 2006-07 and 2009-10	48.15	7.11	19.10	23.84	-6.03	6.20	-16.37	-12.01	-10.79
Annual Compound Growth Rate (%)	-5.77	-3.48	-4.41	-7.79	-2.49	-5.62	-2.02	0.99	-1.21

* Percentage share of yield under unirrigated to that of irrigated crop.

Table 28: Growth Rates of Area, Production and Productivity of Cotton under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Area (Ha)			Production (Bales of 170 kgs of lint each)			Productivity in terms of lint (Kgs /ha)		
	Irriga- ted	Unirri- gated	Total	Irriga- ted	Unirriga- ted	Total	Irriga- ted	Unirri- gated	Combined
2000-01	65114	104803	169917	165180	151420	316600	431	245	316
2001-02	58506	105663	164169	118860	110870	229730	345	178	238
2002-03	25655	49917	75572	50086	33456	83542	332	114	188
2003-04	43865	53912	97777	82362	40325	122687	319	127	213
2004-05	58366	70998	129364	114095	71865	185960	332	172	244
2005-06	43985	65757	109742	92859	75295	168154	359	195	260
2006-07	38374	61965	100339	103889	116975	220864	460	321	374
2007-08	35452	63883	99335	93777	106896	200673	450	284	343
2008-09	31752	82764	114516	88009	99664	187673	471	205	279
2009-10	29818	74277	104095	80042	145406	225448	456	333	368
Average	43089	73394	116483	98916	95217	194133	396	217	282
Percentage share to total	36.99	63.01	100.00	50.95	49.05	100.00		54.97*	
Percentage Change between 2006-07 and 2009-10	-22.30	19.87	3.74	-22.95	24.31	2.08	-0.87	3.74	-1.60
Annual Compound Growth Rate (%)	-6.29	-1.96	-3.42	-3.02	4.84	0.97	3.26	6.80	4.39

* Percentage share of yield under unirrigated to that of irrigated crop.

Table 29: Growth Rates of Total Cropped Area under Irrigated and Unirrigated Conditions in Tamil Nadu during 2000-2010

Year / Particulars	Irrigated Area	Un irrigated Area	Total Cropped Area (Food & Non-Food Crops)
2000-01	3490308	2847801	6338109
2001-02	3412353	2814104	6226457
2002-03	2622291	2568817	5191108
2003-04	2478558	2837469	5316027
2004-05	3087108	2801961	5889069
2005-06	3396700	2636018	6032718
2006-07	3309283	2533507	5842790
2007-08	3251680	2563494	5815174
2008-09	3393106	2431142	5824248
2009-10	3238234	2333476	5571710
Average	3167962	2636779	5804741
Percentage share to total	54.58	45.42	100.00
Percentage Change between 2006-07 and 2009-10	-2.15	-7.90	-4.64
Compound Growth Rate (%)	0.80	-1.96	-0.46

Source: Season and Crop Reports of the concerned years.

Evaluation of Major Rainfed Crop Production Programmes

Dry land agriculture assumes special significance in terms of ecology, agricultural productivity, food and livelihood security for millions of rural households in India. Rainfed areas not only constitute about three-fourth of the land mass under arid, semi-arid, and dry-humid zones, but also account for nearly 55 per cent of the agricultural land spread across large parts of the country. Dry land crops are characterized by low yield potential which however could be reversed by the adoption of better management practices and the returns could be enhanced through value – addition.

Rainfed agriculture is complex, diverse and risk-prone activity. However, rainfed areas, if managed properly have the potential to contribute a larger share in the agricultural production. These high potential rainfed areas provide us with opportunities for faster agricultural growth compared to irrigated areas that have reached a plateau.

Holistic agriculture development through Integrated Farming System (IFS) provides an opportunity for development and integration of multiple components of agricultural system such as agricultural crops, horticulture crops, livestock, fishery, agro-forestry with agro-based income generating activities and value addition. In this direction, Rainfed Area Development Programme (RADP) introduced in the year 2011-12 as a sub-scheme under Rashtriya Krishi Vikas Yojana (RKVY) is being piloted in 10 States with an outlay of about Rs.250 crore for productivity enhancement and augmenting family income through alternate production systems. The main objective of RADP is to increase agricultural productivity of rainfed areas in a sustainable manner by adopting appropriate farming systems based upon the natural resource assets/endowments (ponds, land development, nursery etc) created either by the farmers or through schemes like Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA), Rashtriya Krishi Vikas Yojana (RKVY), National Horticulture Mission (NHM) and Watershed Projects (Guidelines for Rainfed Area Development Programme (RADP), Department of Agriculture and Cooperation (DAC), Government of India).

The Government of Tamil Nadu also has made continued efforts to enhance the productivity of dry land crops. One of the main objectives of the Eleventh Plan being implemented in Tamil Nadu is to focus on rain fed crops in a mission mode so as to increase

production as well as farmers' income. The important strategies and thrust areas focused to achieve this laudable objective were:

- Bringing every piece of cultivable land under cultivation and taking efforts to bring the fallow lands under cultivation.
- Ensuring social security for beneficiaries of '2 acre land distribution scheme' through improvement of irrigation facilities and diversified farming.
- Providing alternate livelihood option to the farmers especially dryland agriculture through farming system approach.

The ongoing schemes during the Tenth Five Year Plan period such as Integrated Cereal Development Programme (ICDP) in rice (Rs.2.87 crore), Procurement and distribution of paddy and millet seeds (Rs.80.67 crore), Crop and Plant protection (Rs.6.87 crore), Increasing Oil Seed Production (Rs.42.16 crore), Intensive Cotton Development Programme (ICDP) (Rs.5.12 crore), Crop insurance schemes (Rs.102.00 crore), Development of pulses (Rs.9.24 crore), Agricultural mechanization (Rs.5.00 crore), Alkali soil reclamation (Rs.0.60 crore) Drip and sprinkler to cover farm pump sets particularly in ground water stress block-general/special (Rs.46.45 crore), Oilseed Production Programme - Scheduled Caste Sub-Plan (Rs.17.00 crore), National Horticulture Mission (Rs.200.00 crore), Agricultural Labour Welfare Board (Rs.100 crore) continued during the Eleventh Plan Period.

Apart from the above, area - specific programmes such as Hill Area Development Programme (HADP) (Rs.16.13 crore), Watershed development and horticulture development under Western Ghat Development Programme (WGDP) (Rs.8.20 crore) and Scheduled Caste Sub-Plan were also continued during the Eleventh Plan period.

Development of Dry Land Crops in Tamil Nadu

The various efforts carried out for the development of dry land crops in Tamil Nadu through the implementation of state and central sponsored schemes are summarized below:

On – Going Schemes

1. Crop Yield Competition

Farmers have been awarded every year for achieving the maximum yield for different crops in the state. An outlay of Rs. 0.83 crores has been earmarked for the purpose.

Table 1: Farmers Awarded in Tamil Nadu (2009-10)

Year	Physical		Financial (Rs. lakhs)	
	Target	Achievement	Target	Achievement
2009-10		1135		113.50
2010-11				11.56

Seed Village Scheme

i) Distribution of Seeds – Oilseeds

Year	Physical (Tonnes)			Financial (Rs in Lakhs.)		
	Target	Achievement	% age of Achievement	Target	Achievement	% age of Achievement
2006-07	492.00	428.91	87.18	48.86	47.97	98.18
2007-08	538.50	311.56	57.86	53.65	33.84	63.08
2008-09	400.00	303.30	75.83	40.00	30.33	75.83
2009-10	3600.00	1687.00	46.86	720.00	329.69	45.79
2010-11	3750.00	2508.00	66.88	1125.00	675.50	60.04
Total	8780.5	5238.77	59.66	1987.51	1117.33	56.22

The physical target set for the distribution of oilseeds for the five years from 2006-07 to 2010-11 was 8781 tonnes, of which the achievement was only 60 per cent. In financial terms, the achievement was to the extent of 56 per cent only during the above mentioned period.

ii) Distribution of Seeds – Pulses

Year	Physical (Tonnes)			Financial (Rs in Lakhs.)		
	Target	Achievement	% age of Achievement	Target	Achievement	% age of Achievement
2006-07	25.20	27.25	108.13	5.08	5.13	100.98
2007-08	149.00	67.02	44.98	29.10	14.75	50.69
2008-09	50.00	64.37	128.74	10.00	12.87	128.74
2009-10	660.00	640.00	96.97	132.00	151.83	115.02
2010-11	2000.00	2025.00	101.25	600.00	685.47	114.26
Total	2884.20	2823.64	97.90	776.18	870.05	112.09

In case of pulses, the physical target set for the distribution of seeds during the Eleventh Five Year Plan viz., from 2006-07 to 2010-11, was 2884 tonnes and the target was almost achieved with 98 per cent of achievement. In financial terms also, the achievement was more than that of the targets set. However, the achievements, in terms of both physical and financial, were very low during 2007-08.

iii) Distribution of Seeds – Millets

Year	Physical (Tonnes)			Financial (Rs in Lakhs.)		
	Target	Achievement	% age of Achievement	Target	Achievement	% age of Achievement
2009-10	200	169	84.50	20.00	19.25	96.25
2010-11	300	174	58.00	45.00	20.57	45.71
Total	500	343	68.60	65.00	39.82	61.26

The physical target set for millets which are mostly cultivated under dry lands during 2009-10 and 2010-11 was 500 tonnes. However, only two – thirds of the target was achieved (69 per cent). In financial terms, the percentage of achievement was 61 per cent. The achievements (both physical and financial) were far lesser than the target during 2010-11.

iv) Training

Year	Physical (Numbers)			Financial (Rs in Lakhs.)		
	Target	Achievement	% age of Achievement	Target	Achievement	% age of Achievement
2006-07	300	300	100.00	45.00	45.00	100.00
2007-08	680	331	48.68	102.00	49.40	48.43
2008-09	366	369	100.82	55.00	55.35	100.64
2009-10	4000	3968	99.20	600.00	595.20	99.20
2010-11	2000	2000	100.00	300.00	300.00	100.00
Total	7346	6968	94.85	1102.00	1044.95	94.82

The physical target for conducting training programmes under 'Seed Village Scheme' for the five year period from 2006-07 to 2010-11 was 7346 of which the achievement was substantial to the extent of 95 per cent. Similarly, the financial achievement was also to the extent of 95 per cent.

v) Distribution of Storage Bins

Year	Physical (Numbers)			Financial (Rs in Lakhs.)		
	Target	Achievement	% age of Achievement	Target	Achievement	% age of Achievement
2009-10	52900	56921	107.60	768.00	632.13	82.31
2010-11	39850	58283	146.26	586.00	571.16	97.47
Total	92750	115204	124.21	1354.00	1203.29	88.87

Storage bins are essential for storing either grain or seed as far as dry crops are concerned and therefore, it was targeted to distribute as many as 92750 numbers of storage bins in two years, viz., 2009-10 and 2010-11. Although the physical achievements were more than the targets for both the years, the financial achievements were lesser than their respective targets.

Promotion of Jatropa - Honourable Minister for Agriculture Announced Scheme

Particulars	2006-07		2007-08		2008-09		2009-10		2010-11		Total		
	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	% of Achievement
Physical (Ha)	122	122	20000	2163	36566	1665	26950	90	-	-	83638	4040	4.83
Financial (Rs Lakhs)	27.337	27.122									27.337	27.122	99.21

Coconut Development Board Schemes - Physical -(No.of seedlings)

Particulars	2006-07		2007-08		2008-09		2009-10		2010-11		Total		
	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	% age of Achievement
TxD Production at Navlock													
Production	107200	107655	1,07,000	108600	1,43,000	117400	1,20,000	1,21,000	1,60,000	1.647	637200	454656.65	71.35
Distribution	75000	65255	75,000	47,979	1,00,000	73619	84,000	91,200	1,12000	0.707	445200.00	278053.71	62.46
Establishment of Regional Coconut Nursery	333534	354641	200000	111969	336600	181052	230000	269140	2.300	4.630	1100136.39	16806.63	83.34
Coconut Development Board Assisted Schemes													
Management of disease affected palms	126885	111119	25766	24884	-	-	-	-	-	-	152651	136003	89.09
Laying out of Demonstration (I year and maintenance)	1350	1349.85	980	903	-	-	-	-	-	-	2330	2252.85	96.69
Organic manure units	80	80	25	22	-	-	-	-	-	-	105	102	97.14
Copra Dryer (Nos.)	30	9	-	-	-	-	-	-	-	-	30	9	30.00
Area Expansion (Ha)	1000	1231.64	950	623.02	-	-	-	-	-	-	1950	1854.66	95.11
Control of E.Mite in coconut Distribution of Azadiractin 1% (in litres)	-	-	-	-	71168.75	30570.355	-	-	-	-	71168.75	30570.355	42.95
Laying out of Demonstration Plots (Maintenance)	-	-	-	-	250	243	750	746	1500	750	2500	1739	69.56

Coconut Development Board Schemes - Financial – (Rs in Lakhs)

Particulars	2006-07		2007-08		2008-09		2009-10		2010-11		Total		
	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	% age of Achievement
TxD Production at Navlock													
Production	18.750	20.377	18.750	16.821	25.000	24.899	30.000	23.180	40.000	30.245	132.5	115.522	87.19
Establishment of Regional Coconut Nursery	37.520	31.760	50.000	24.268	48.05	45.263	96.407	55.687	57.500	57.460	289.477	214.438	74.08
Coconut Development Board Assisted Schemes													
Management of disease affected palms	317.213	277.797	240.915	190.038	-	-	-	-	-	-	132.5	115.522	87.19
Laying out of Demonstration (I year and maintenance)	236.250	236.184	64.415	62.210	-	-	-	-	-	-	289.477	214.438	74.08
Organic manure units	16.000	16.000	171.500	158.025	-	-	-	-	-	-	558.128	467.835	83.82
Copra Dryer (Nos.)	2.820	0.619	5.000	4.400	-	-	-	-	-	-	132.5	115.522	87.19
Area Expansion (Ha)	-	-	-	-	-	-	-	-	-	-	289.477	214.438	74.08
Control of E.Mite in coconut	-	-	-	-	-	-	-	-	-	-	558.128	467.835	83.82
Distribution of azadiractin 1% (in litres)	-	-	-	-	-	-	-	-	-	-	132.5	115.522	87.19
Laying out of Demonstration Plots (Maintenance)	-	-	-	-	43.750	42.525	131.250	130.550	262.500	261.100	132.5	115.522	87.19

Coconut Development Board Schemes

The physical target on production of TxD coconut seedlings at Navlock farm was achieved to the extent of 71 per cent while the financial target has been achieved to the extent of 87 per cent. Similar was the result in case of the establishment of Regional Coconut Nursery.

The Coconut Development Board assisted schemes such as Management of disease affected palms, Laying out of Demonstration, Organic manure units, Distribution of Copra Dryers, Coconut Area Expansion, Control of E.Mite in coconut, Distribution of Azadiractin 1%, Laying out of Demonstration Plots, etc. have been largely implemented with the percentage of achievement of more than 70 per cent.

Promotion of Jatropha

As regards the efforts to promote Jatropha were concerned, the achievement of physical target was to a meager extent of 4.8 per cent during a four – year period from 2006-07, while there was almost a total achievement of financial target (99.2 per cent) during the first year of 2006-07.

Macro Management Mode Scheme

S.No	Particulars	Financial –(Rs. In lakhs)												
		2006-07		2007-08		2008-09		2009-10		2010-11		Total		
		Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	
1.	Integrated Cereals Development Programme													
i.	Paddy Seed Subsidy	298.56	288.928	300.000	265.697	240.400	297.482	557.084	574.460	600.00	581.504	1996.044	2008.071	100.60
ii.	Integrated Pest Management (IPM)	86.53	86.213	100.300	99.192	170.510	167.332	91.970	90.360	93.50	92.572	542.81	535.669	98.68
iii.	System Rice Intensification (SRI)	90.00	93.518	283.000	290.409	831.000	808.156	600	591.324	600.00	596.293	2404	2379.7	98.99
iv.	Contingencies & Pol	8.40	8.111	9.000	7.441	6.900	7.130					24.3	22.682	93.34
v.	- Village Campaign					100.000	79.661					100	79.661	79.66
	Total Finance	748.00	746.284	691.700	662.739	1382.680	1359.761	1261.240	1261.748	1309.02	1276.776	5392.64	5307.308	98.42
2	Farmers Interest Groups -			147.60	146.82	127.670	127.570					275.27	274.39	99.68
i.	Name of the Component: Group Formation and Office Automation	60.00	59.511	60.00	60.00							120	119.511	99.59
ii.	Training to Farmers Interest Groups			48.00	47.96							48	47.96	99.92

iii.	Issue of I.D cards to Farmers Interest Groups			4.80	4.75											4.8	4.75	98.96
iv.	District Level Meeting			14.80	14.80											14.8	14.8	100.00
v.	State Level Meeting			2.00	2.00											2	2	100.00
vi.	Documentation / Contingencies / Communication	2.19	2.1819	18.00	17.82											20.19	20.0019	99.07
vii.	Office automation and setting up of Library for new FIGs - Physical																	
3	TANWABE								319.198	318.417						319.198	318.417	99.76
i.	Promotion Of Micro Enterprises Activities @ Rs.10,000 per Group			72.450	72.450				202.50	202.30						274.95	274.75	99.93
ii.	One Day EDP Training Rs 750/Training/Group		73.34						15.188	15.188						88.848	88.528	99.64
iii.	Setting up of Small EDP Units.		257.81													257.81	257.81	100.00
iv.	Data Base / Networking		19.60													19.6	19.6	100.00
v.	Production of Bio Agents		45													45	45	100.00
vi.	Mechanization		66.75													66.75	65.568	98.23

ATMA TARGET AND ACHIEVEMENT

Particulars	2006-07		2007-08		2008-09		2009-10		2010-11	
	TAR	ACH	TAR	ACH	TAR	ACH	TAR	ACH	TAR	ACH
Training										
Within state	54.000	19.050	52.545	51.975			49.200	21.35	82.500	17.700
Within District									199.400	37.280
Demonstration										
Agrl.	54.000	19.100	53.110	53.110			167.175	50.93	133.000	57.870
Allied									84.680	27.370
Exposure Visit (Inter State)	29.950	5.922	29.357	21.950			30.000	5	170.700	50.880
Exposure visit (Inter District)	24.050	8.800	23.300	20.300			39.375	22.78	80.500	23.700
Mobilise FIGsCapacity Bldg.	44.930	9.000	17.650	16.700					23.850	8.600
FIGs Seed Money/Revolving Fund	45.020	9.650	29.900	27.600					37.800	13.900
Rewards and Incentives to best FIGs,	9.000	0.000	0.000	0.000					2.200	1.300
Exhibition / Kisan mela	18.000	0.200	12.000	9.950					5.300	11.560
Printing of Leaflets & Local Advertisements	31.500	8.150	18.000	16.847					108.000	12.000
Tech. Package through IT Network	15.700	1.700	2.250	2.200			4.000	0.400	9.400	2.200
Farmers Scientist Interaction	3.600	1.700	3.600	3.000			11.200	2.800	11.200	4.200
Field Days	36.000	12.100	17.700	17.200			69.200	17.700	113.400	22.200
Frontline Tech through KVK/ZRS	13.500	4.000	13.600	13.300						
Developing SREP	22.500	16.029	22.100	20.799						
ATMA Expenses	13.500	2.668	6.750	5.415						

Mission on Rain fed Farming in Tamil Nadu

The Government of Tamil Nadu has initiated a Mission on Rain fed Farming to increase the productivity and income of the farmers in rainfed areas by adopting integrated watershed approach also. The project further aims at improving the ground water level by appropriate rainwater harvesting techniques, reducing soil erosion, adoption of mixed farming for recycling of organic waste etc. The financial assistance for this scheme was proposed to be dovetailed from the State and Centrally Sponsored schemes.

Demonstration under Farming Systems Approach / Rain fed Farming

The farming systems approach has been conceptualized to diversify extension programmes into livestock, horticulture and other high value commodities that would increase the farm income. It is proposed to conduct demonstration of integrated farming systems and dryland farming techniques in a big way. A sum of Rs.1 crore for subsidy for evolving demonstration under Farming System Approach/Rainfed Farming techniques has been proposed for the Eleventh Plan.

Integrated Scheme for Oil seeds, Pulses, Oil Palm, and Maize (ISOPAM)

This is a centrally sponsored scheme (75: 25 basis), under which it is proposed to undertake DAP foliar spraying to increase of production (Rs.100/ ha subsidy), distribute the Micro Nutrient Manganese Sulphate to increase the yield in gingelly crop (50% subsidy) and distribute minikits containing new varieties under pulses, oilseeds and millets of other state varieties in order to study the performance (1000 Nos. of minikits per crop per year). An amount of Rs.2.72 crore is proposed as state share for this scheme.

Outlay Allocated for the Development of Dry Land Crops during Eleventh Plan in Tamil Nadu

The new State Schemes proposed by the Government of Tamil Nadu for the development of dry land agriculture during eleventh five year plan were discussed below:

Totally an amount of Rs.2885.90 crore for crop husbandry of which Rs.2173.44 crore for new schemes have been suggested. The details of financial outlay are given in Table 1.

**Table 1: Proposed Outlay for Crop Husbandry Sector during the Eleventh Plan Period
(2007-2012)**

(Rs. Crores)

S. No.	Scheme	Plan Outlay
A.	On – Going Schemes	
1.	Crop Yield Competition	0.83
2.	Integrated Cereals Development Programme (ICDP) in Rice	2.87
3.	Integrated Cereals Development Programme – Accelerated Maize Development Programme (AMDP)*	0.50
4.	Procurement and Distribution of Paddy and Millets Seeds*	80.67
5.	Infrastructure creation for seed processing units	0.83
6.	Foundation Seed Production for Groundnut*	0.50
7.	Vermi – Composting of Agricultural Waste	1.13
8.	Crop and Plant protection	6.87
9.	Increasing Oil Seed Production Programme*	42.16
10.	Sustainable Development of Sugarcane based Cropping System Areas (SUBACS)	0.61
11.	Intensive Cotton Development Programme (ICDP)	5.12
12.	Production of T × D Coconut seedlings	0.06
13.	Distribution of Coconut Seedlings to Female Infants	1.05
14.	Extension and Training	0.94
15.	Crop Insurance Scheme	102.00
16.	Scheme for Improvement of Crop Statistics Scheme (ICSS)	1.27
17.	Development of Pulses*	9.24
18.	Scheme for Agricultural Mechanization	5.00
19.	Reclamation of Alkali Soil	0.60
20.	Drip and Sprinkler to cover Farm Pumpsets particularly in Ground Water Stress Blocks – General / Special	46.45
21.	Supply of Leaf Colour Chart	0.10

Table 1 (contd...)

22.	Oil Seed Production Programme – Scheduled Caste Sub – Plan (SCSP)*	17.00
23.	Increasing the Production of Oilseeds - Scheduled Caste Sub – Plan (SCSP)*	9.35
24.	Procurement and Distribution of Paddy and Millets – Scheduled Caste Sub – Plan (SCSP)*	36.09
25.	Drip and Sprinkler to cover Farm Pumpsets particularly in Ground Water Stress Blocks - Scheduled Caste Sub – Plan (SCSP)	5.50
26.	Agriculture and Horticulture Development Programme - Scheduled Caste Sub – Plan (SCSP) – Others	4.95
27.	Agricultural Schemes in Tribal Area – Tribal Area Sub – Plan (TSP)	2.42
28.	National Horticulture Mission	200.00
29.	Promotion of Inter Cropping in the Nilgiris	2.75
30.	Innovative Programme on Cultivation Aspects, Extension and Marketing	1.27
31.	Agricultural Labour Welfare Board	100.00
32.	Prevention of Soil Erosion in Slopy Areas under Hill Area Development Programme (HADP)	16.13
33.	Watershed Development and Horticulture Development under Western Ghats Development Programme (WGDP)	8.20
	Total On – Going Schemes	712.46
B.	New Schemes	
1.	National Food Security Mission	500.00
2.	National Agricultural Development Programme (NADP) / Rashtriya Krishi Vikas Yojana (RKVY)	1500.00
3.	Irrigated Agriculture Modernization and Water Bodies Restoration and Management Project (IAMWARM)	65.00
4.	Drip Irrigation for Sugarcane	70.00
5.	Demonstration of System of Rice Intensification (SRI) Techniques	5.00
6.	Strengthening of Seed Processing Units	0.58
7.	Exposure Visits to Other States for Exchange of Ideas	0.22

8.	Holistic Village Adoption Scheme	0.28
9.	Subsidy for Evolving Demonstration under Farming Systems Approach / Dry Land Development*	1.00
10.	Scheme under Macro Management Mode (MMM)	1.24
11.	Integrated Scheme for Oilseeds, Pulses, Oilpalm and Maize (ISOPOM)*	2.72
12.	Technology Mission on Oilseeds – Coconut	10.00
13.	Agricultural Facilitation Centre	0.50
14.	Post – Tsunami Scheme- Livelihood Support Scheme Funded by International Fund for Agricultural Development (IFAD)	10.00
15.	Computerization and Broad Band Connectivity	6.90
	Total – New Schemes	2173.44
	Grand Total – State Schemes	2885.90
	Centrally Sponsored (100%) Schemes - Total	93.93
	Centrally Sponsored (Shared) Schemes - Total	1905.14
	All Schemes	4884.97

* Projects being implemented for increasing the production of dry land crops solely or in combination with other crops.

In eleventh plan period, an amount of Rs. 2,886 crores was allocated for the development of agriculture by the Government of Tamil Nadu, of which an amount of Rs.199.23 crores accounting for 6.90 per cent of the total outlay was allocated for the development of dry land crops solely or in combination with other crops.