# ASSESSING THE SUBSECTOR CONTRIBUTION OF STATE INCOME AND ITS POTENTIAL

## Introduction

Agriculture and allied activities act as a growth engine by ensuring food and nutritional security to the masses besides providing raw-materials to agro-based industries and also providing employment and thereby income to the rural folk of the State and Indian Economy. The share of agriculture sector in providing employment accounted for 52 per cent at the national level and the performance of agriculture sector lends a helping hand for the growth engine of the State's Economy. Agriculture in the state of Tamil Nadu has undergone major structural changes in terms of the share of allied sectors in agriculture. In recent times, owing to the steady growth in service sector, the relative contribution of agriculture to the State income has declined, even though agriculture as a sector has been growing over a period of time. The State Government has been implementing several programmes and projects to sustain the growth momentum in agriculture. However, these programmes / projects need not necessarily lead to a uniform growth in all the crops / subsectors within agricultural sector. In this context, it is appropriate to look into the changes took place in individual crops in terms of their relative contribution to the gross domestic product from agricultural sector as a whole. It will also provide a rationale / basis for determining the specific investments that need to be made for different crops / sectors during the XII Five Year Plan Period.

## Methodology

The present study was taken up with the specific objective of analyzing the growth trends in gross domestic product from agricultural sector, the relative contribution of individual crops / sub-sectors to the gross domestic product vis-à-vis the growth in overall state domestic product. An attempt has also been made to relate the growth in agricultural sector with the growth in important factors behind the growth of agricultural sector.

### *Data sources*

The data on crop production, area and yield were obtained from the Season and Crops Report for the various years. The gross and net state domestic products were collected from Tamil Nadu – An Economic Appraisal, for the respective years. The value of

individual crops and their share in gross domestic product from agricultural sector were worked out based on the data collected from the office of the Director of Economics and Statistics, Government of Tamil Nadu.

***Analysis of growth rate***

To study the growth trends in State income the following form of compound growth equation was fitted.

$$\ln Y_t = a+bt$$

where,

$\ln Y_t$ = natural logarithm of the variable for which growth is to be estimated

t = time (1,2,….)

a and b are the regression coefficients to be estimated.

Using the estimated value for b the compound growth rate in Y is estimated using the following formula:

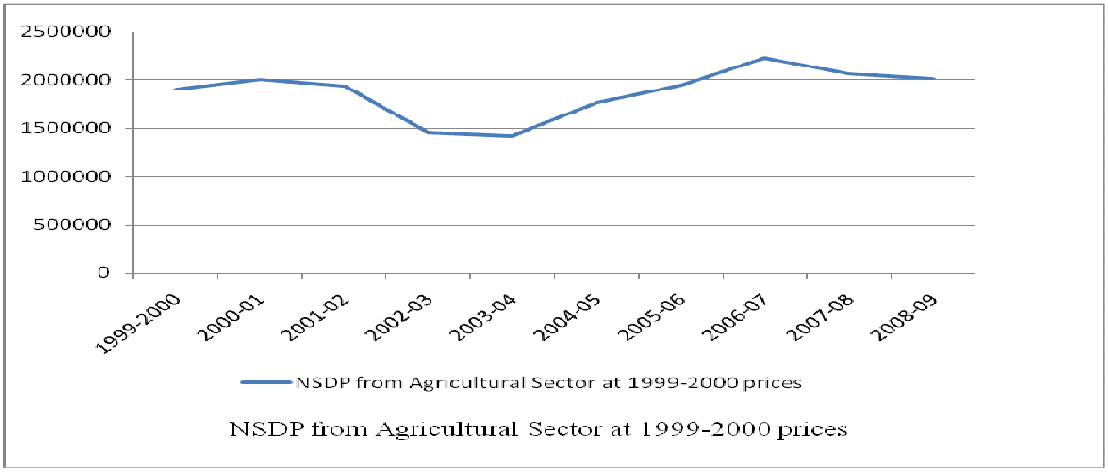
$$r = (\text{antilog of } b - 1) \times 100$$

where, r = compound growth rate in Y

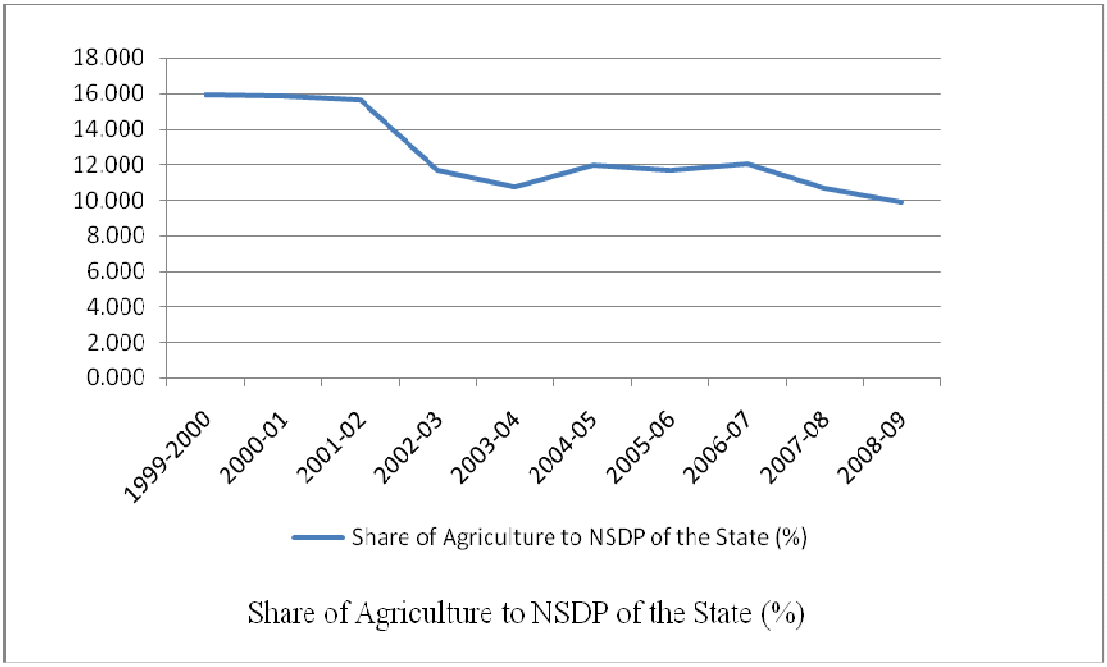
**Performance of Agriculture in Tamil Nadu**

The growth rate in gross and net state domestic products from agricultural sector at constant prices have recorded very meager growth in the last 10 years, that is, from 1999-2000 to 2008-09. While the overall gross and net state domestic products at constant prices for the state have grown by 70 per cent over this period, the GSDP and NSDP from agricultural and allied activities have recorded a growth of only about 6 to 7 percent over a period of 10 years. The overall state economy has recorded an impressive growth rate with both the GSDP and NSDP at constant prices showing a compound growth rate of about 6.7 per cent per annum during the period 1999-2000 to 2008-09, while the GSDP and NSDP from agricultural and allied activities have recorded a meager growth of only 1.5 per cent per annum during the same period. Since the gross and net state domestic products from agricultural and allied sectors have not grown in tandem with the faster overall economic growth in the state, the share of agriculture and allied activities in the overall Gross State Domestic Product of Tamil Nadu at current prices has

decreased from about 15 per cent during 1999-2000 to 10.72 per cent during 2008-09. The share of agriculture in the Net State Domestic Product at current prices has declined from 15.93 per cent to 11.48 per cent during the same period. The contribution of agriculture (including allied activities) of the State to the Gross State Domestic Product (GSDP) at constant prices accounts for only 9.4 per cent in 2008-09. However, the agriculture sector ensures household food security and brings forth equity in distribution of income and wealth which would result in the reduction of poverty.



NSDP from Agricultural Sector at 1999-2000 prices



Share of Agriculture to NSDP of the State (%)

The data on agricultural GDP at current and constant prices in Tables 1. The data presented in Table 1 reveal that though the Gross Domestic Product from agricultural

sector at current prices has increased by more than 75 % over the ten-years period from 1999-2000 to 2008-09, the same at constant prices has not shown significant progress during this period. This implies that the overall agricultural production has been remaining almost stagnant over the ten years.

Table 1. Agricultural GDP in Tamil Nadu
(Rs.crores)

| Year | Agricultural GDP at current prices | Agricultural GDP at constant (1999-2000 prices) |
|---|---|---|
| 1999-2000 | 20169 | 20169 |
| 2000-01 | 21489 | 21210 |
| 2001-02 | 21173 | 20623 |
| 2002-03 | 17127 | 15844 |
| 2003-04 | 17560 | 15485 |
| 2004-05 | 22777 | 18971 |
| 2005-06 | 27112 | 20791 |
| 2006-07 | 33425 | 23837 |
| 2007-08 | 37088 | 22116 |
| 2008-09 | 36354 | 21530 |

The data presented in Table 2 indicate that both at national level and in the state of Tamil Nadu, the share of agricultural sector in the economy is shrinking steadily over time. While the share of agriculture in the gross domestic product of India has declined from about 15 per cent in 2004-05 to about 11 per cent in 2010-11, while the share of agriculture in the net state domestic product of the Tamil Nadu state has declined from about 10 percent to about seven percent during the same period.

Table 2. Comparison of the Share of Agriculture in the NSDP of Tamil Nadu State and the Share of Agriculture in the GDP of India

| Year | Net State Domestic Product from Agriculture at factor costs (Constant Prices) | Net State Domestic Product from all sectors at factor costs (Constant Prices) | Share of Agriculture to NSDP of the state | Share of Agriculture to the GDP of India (Constant Prices) |
|---|---|---|---|---|
| 2004-05 | 19461.1 | 193645.10 | 10.05 | 14.65 |
| 2005-06 | 21786.5 | 221588.00 | 9.83 | 14.11 |

| | | | | |
|---|---|---|---|---|
| 2006-07 | 25298.6 | 256285.70 | 9.87 | 13.43 |
| 2007-08 | 23924.5 | 272339.80 | 8.78 | 13.38 |
| 2008-09 | 23084.7 | 285053.50 | 8.10 | 12.32 |
| 2009-10 | 23544.4 | 312071.90 | 7.54 | 11.34 |
| 2010-11 | 25384.8 | 349334.60 | 7.27 | 10.92 |

The compound growth rates in overall gross and net state domestic products and that of agricultural sector in the state are presented in Table 3. The growth rates for the gross domestic products for India are also presented for the purpose of comparison. The details presented in Table 3 reveal that while the gross and net state domestic products from all sectors at constant prices have registered a growth rate of more than 6 per cent per annum, the growth rate of agricultural GSDP has been much lower at around 1.5 per cent per annum. Consequently, the share of agricultural sector to the GSDP and NSDP at constant prices has fallen by about 5 % per cent per annum during the latest decade.

Table 3. Compound growth rate of State Domestic Product and State Domestic Product from Agriculture (2004-05 to 2010-11)

| S.No. | Particulars | Agriculture | All sectors | % share of agriculture to State Domestic Product from all sectors |
|---|---|---|---|---|
| 1 | GSDP at Current Prices | 9.32 | 11.5 | -2.9 |
| 2 | GSDP Constant Prices | 3.26 | 6.7 | -5.81 |
| 3 | NSDP at Current Prices | 5.98 | 13.3 | -2.7 |
| 4 | NSDP Constant Prices | 3.12 | 9.58 | -5.89 |
| 5. | GDP of India at current prices | 15.78 | 14.35 | -4.34 |
| 6. | GDP of India at constant prices | 3.17 | 8.51 | -6.11 |

**Share of Different Crops in Agricultural GDP of the State**

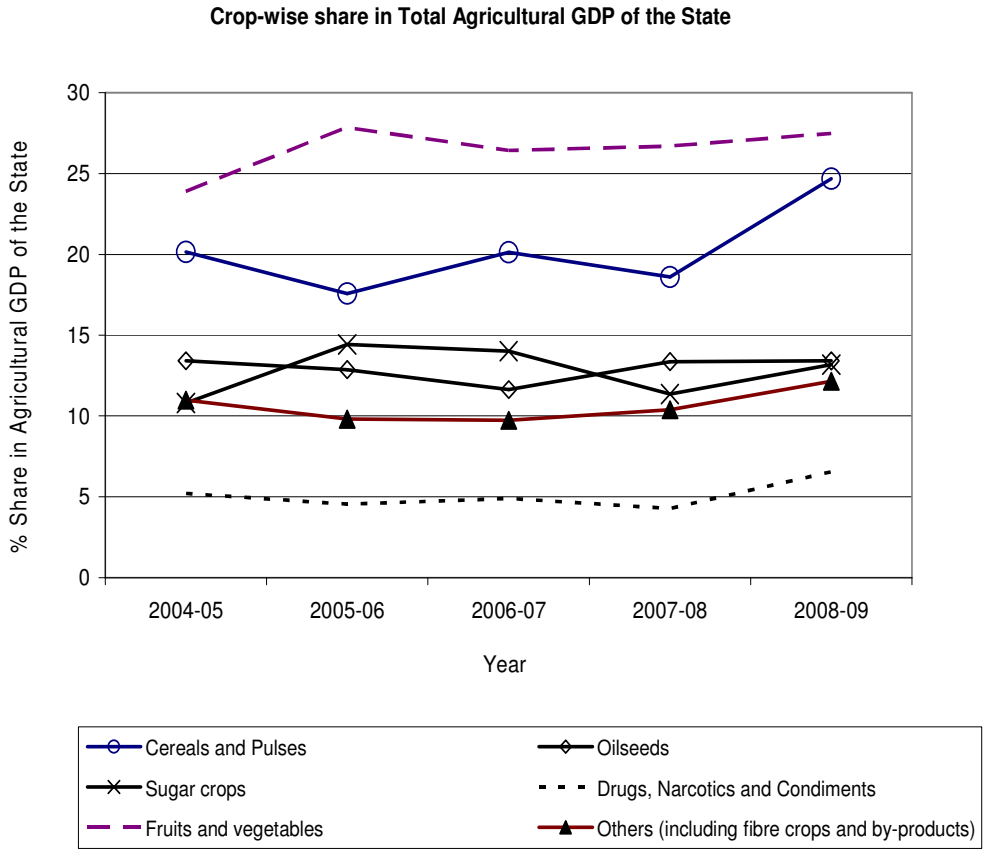
The share of different crops in the State's Agricultural GDP has been estimated for the XI Five Year Plan period and the details are presented in Table 4. The Table 4

reveals that there has been a marked increase in the share of the value of cereals in the State's Agricultural GDP over the five year period. The share of cereals which was about 22 per cent during the first year of the XI plan period has shot up to 24 % during the last year of the plan period. The major crops that contributed for the increased share of cereals were paddy and maize. The share of pulses remained almost stagnant around 1 to 2 per cent and the share of oilseeds also remained fluctuating around 13 to 15 percent.

Table 4. Share of different commodity groups in total agricultural GDP of the State

| Crops | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 |
|---|---|---|---|---|---|
| Paddy | 19.846 | 16.824 | 17.821 | 17.252 | 19.715 |
| Cereals | 22.172 | 18.521 | 20.822 | 20.556 | 24.006 |
| Pulses | 1.682 | 1.669 | 2.350 | 1.399 | 1.308 |
| Oilseeds | 15.891 | 14.779 | 13.407 | 15.781 | 13.753 |
| Sugar crops | 12.796 | 16.564 | 16.147 | 13.421 | 13.531 |
| Fibre crops | 0.744 | 0.610 | 0.603 | 0.714 | 0.769 |
| Drugs and Narcotics | 3.393 | 2.269 | 2.766 | 2.335 | 3.152 |
| Spices and Condiments | 2.775 | 2.958 | 2.877 | 2.729 | 3.575 |
| Banana | 12.02 | 13.59 | 14.79 | 14.60 | 12.58 |
| Mango | 2.84 | 3.64 | 4.27 | 4.21 | 4.08 |
| Tapioca | 5.63 | 7.79 | 5.71 | 5.61 | 4.26 |
| Fruits and vegetables | 28.29 | 31.99 | 30.42 | 31.51 | 28.20 |
| Miscellaneous crops | 2.04 | 1.87 | 1.69 | 1.49 | 1.43 |
| Flowers and kitchen garden | 5.25 | 4.90 | 5.72 | 7.10 | 6.96 |
| Straw and Stacks | 4.97 | 3.87 | 3.20 | 2.96 | 3.31 |
| Grand Total | 100 | 100 | 100 | 100 | 100 |

The share of sugar crops has also shown a fluctuating trend around 13 to 16 percent over the period 2004-05 to 2008-09. The share of drugs and narcotics stayed stagnant around three percent, while fibre crops had a negligible share of less than one percent to the agricultural GDP of the state. The fruits and vegetable crops had a major share in the net state domestic product from agricultural sector with their contribution ranging from 28 to 30 percent during the XI five year plan period. Banana, mango and tapioca are the major horticultural crops having a significant share in the agricultural GDP of the state. The share of flowers and kitchen garden was around 5 to 7 percent of the net state domestic product from agricultural sector.

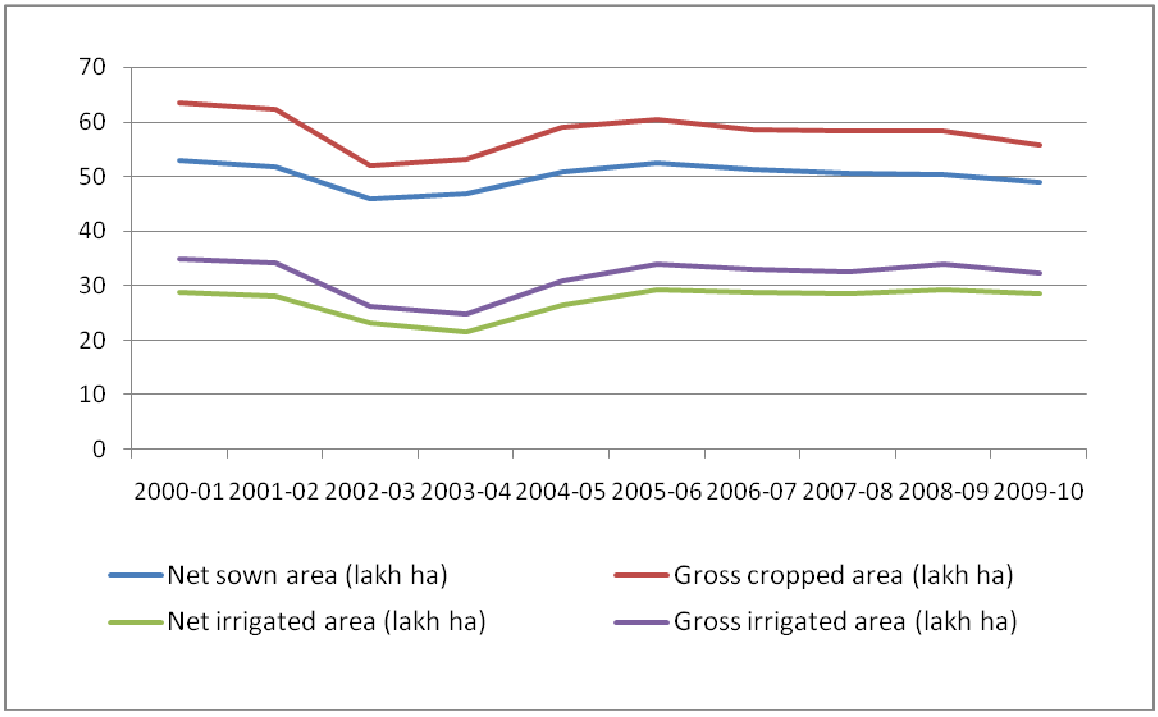



## Trends in Area under Cultivation

The gross cropped area in 2009-10 accounted for about 39 per cent of the total geographical area, of which 56 per cent of the land was irrigated. In this situation, the land and other natural resources are fully utilized in this State. Out of the gross cropped area of 58.05 lakh ha during the latest decade, about 31 lakh ha has been under irrigation, constituting more than 50 per cent of the gross cropped area. The gross irrigated area reached a peak of 35 lakh ha during the 1970s after which it is hovering around 31 lakh ha.

While advances in seed–fertilizer–water technology have contributed to increased production and productivity at State level, the pattern of agricultural growth is not uniform between regions, crops and categories of farmers. The new technologies have not permeated into dry land region and unirrigated crops and, as a result, a number of crops remain untapped to their full potential, and the dry land regions remain underdeveloped

and backward. Dryland farming covers a sizeable area constituting close to 50 per cent of the gross cropped area in the State and remains inefficient in terms of productivity. The annual average rainfall at all India level is 1200 mm whereas the rainfall in Tamil Nadu is 930 mm. There is an urgent need for modernizing dry farming technology laying stress on developing and popularizing drought resistant hybrid crop varieties and evolving appropriate water harvesting techniques.




**Growth rate in area, production and productivity of major crops in the latest decade (2001-10)**

The compound growth rate of area, production and yield of 18 major crops are presented in Table 4. The data reveal that maize was the only major cereal crop which has recorded a significant growth in productivity and production. Sunflower and fruits and vegetables are the other major crops which recorded a significant progress in production, while most of the other crops have not shown significant growth either in production or productivity.

Table 4. Compound Growth Rate for Area, Production and Yield (2001 to 2010)

| S.No | Crops | Area | Production | Yield |
|---|---|---|---|---|
| 1 | Paddy | 0.2 | -0.1 | -0.3 |
| 2 | Sorghum | -3.6 | -2 | 1.6 |
| 3 | Cumbu | -10.8 | -7.5 | 3.7 |
| 4 | Maize | 15.1 | 32 | 14.7 |
| 5 | Total Millets | -1.1 | 9.4 | 10.6 |
| 6 | Total cereals | -0.2 | 1.5 | 1.7 |
| 7 | Total Pulses | -2.2 | -4.1 | -1.9 |
| 8 | Total Food Grain | -0.6 | 1.3 | 1.9 |
| 9 | Sugarcane | 1.9 | 1 | -0.8 |
| 10 | Ground nut | -4.1 | -2 | 2.3 |
| 11 | Gingelly | -4.3 | -5.6 | -1.2 |
| 12 | Sunflower | 17.6 | 16.8 | 4.6 |
| 13 | Total Oilseeds | -4 | -1.8 | 2.3 |
| 14 | Cotton | -3.4 | 0.9 | 4.5 |
| 15 | Fruits | 4 | 8.4 | 4.2 |
| 16 | Vegetables | 3.4 | 5.7 | 2.3 |
| 17 | Spice and condiments | -0.8 | 4 | 4.8 |
| 18 | Plantation Crops | 1.2 | 2.6 | 1.4 |

Based on the compound growth rates for the area, production and productivity of various crops during the latest decade ending 2010, the crops were categorized into those recording significant positive growth in these parameters (> 1 percent growth per annum), negligible growth or stagnation (less than one per cent positive or negative growth per annum) and those which recorded significant negative growth (less than -1 % per annum). The summary of growth is presented in the Table 5. The information provided in the table reveal that maize, sunflower, fruits, vegetables and plantation crops recorded significant positive growth rates in all the three parameters viz., area, production and productivity. Production of sugarcane recorded significant positive growth mainly due to increase in area under sugarcane rather than productivity improvements. Yields have increased by more than one per cent per annum in crops such as sorghum, bajra, maize, sunflower, groundnut, cotton, fruits, vegetables and plantation crops. In spite of the significant positive growth in yields, the area under sorghum, bajra, groundnut, and

cotton has declined significantly. The decline in area under sorghum, bajra and groundnut has more than offset the increase in yield resulting in significant negative growth in their production.

The area under paddy, total cereals and total foodgrains has stagnated during the decade. The productivity of two major irrigated crops viz., paddy and sugarcane has stagnated during the first decade of current century. Significant negative growth rates have been recorded in the yield of pulses and gingelly which are mainly cultivated under rainfed cultivation. The total outturn of crops such as sorghum, bajra, groundnut and total oilseeds have also declined during the latest decade. The area under groundnut, gingelly, cotton, pulses, millets and sorghum and bajra have also declined by more than one per cent per annum during the decade ending 2010.

Table 5. Classification of crops based on growth rates in area, production and productivity

| Crops | Area | Production | Yield |
|---|---|---|---|
| Significant positive growth (> 1 % growth) | Maize, sunflower, fruits, vegetables, plantation crops, sugarcane | Maize, total millets, total cereals, total foodgrains, sunflower sugarcane, fruits, vegetables, spices and condiments, plantation crops | Sorghum, bajra, maize, total millets, total cereals, total foodgrains, groundnut, sunflower, total oilseeds, cotton, fruits, vegetables, spices and condiments, plantation crops. |
| Negligible growth or stagnation (within +1 or -1 % growth) | Paddy, total cereals, total foodgrains | Paddy, cotton. | Paddy, sugarcane. |
| Significant negative growth (< -1% growth) | Sorghum, bajra, total millets, total pulses, groundnut, gingelly, total oilseeds, cotton | Sorghum, bajra, pulses, groundnut, gingelly, total oilseeds | Pulses and gingelly |

**Trends in Irrigated Area**

Tamil Nadu's geographic area consists of 17 river basins, a majority of which is water-stressed. There are 61 major reservoirs; about 40,000 tanks and about 3 million wells (including those meant for drinking water) that heavily utilize the available surface water (17.5 BCM) and groundwater (15.3 BCM). Agricultural sector consumes about 75% of the water resources. Agriculture sector faces major constraints due to water scarcity. There is growing demands for water from industry and domestic users and also interstate competition for surface water resources also intensifies. Given the geographical area of about 13 m.ha and the average annual rainfall of about 950 mm with bi-modal distribution, the surface water potential is estimated at 25000 MCM (893 TMC) and the ground water potential is about 22400 MCM (800 TMC). The demand for non-agricultural purposes in year 2025 will be about 16500 MCM (589 TMC) and the demand for agriculture purposes will be about 45000 MCM (1607 TMC) thus leaving a supply-demand gap of about 14100 MCM (504 TMC) (29.7 %). Given the state water policy, priority is given for domestic use followed by irrigation and industry etc. indicating that agricultural sector has to manage the scarcity in the future. Further the canal systems have poor water control and management. The data on source-wise share of area irrigated to net irrigated area in Tamil Nadu presented in the following Table show that the share of the surface irrigation sources is on continuous decline with tanks accounting for most of the decline, while the private well irrigation gaining preeminent position. The share of well irrigated area has steadily increased from about 35 per cent to more than 50 per cent in the latest decade. Also, out of the 1.8 million wells, about 0.16 million wells are defunct in the state as the water table is fast declining.

The area irrigated by tanks have declined by more than 40 per cent over the last five decades, while well irrigated area has more than doubled from about 6.5 lakh ha in 1960s to more than 14 lakh ha in the latest decade (Table 6). In spite of the phenomenal increase in private investments in well irrigation coupled with public investments in electrification and provision of subsidized power supply to agriculture, the net irrigated area and gross irrigated area have not shown any remarkable growth over time. The two important reasons for this are the continuous decline in tank irrigated area due to various socio-economic issues in tank management, the exhaustion of potential for expansion of

canal irrigated area and the increase in area under water-intensive crops such as sugarcane, turmeric, banana and coconut.

Table 6. Trends in area irrigated by different sources in Tamil Nadu

(Area in lakh ha)

| Variable | 1960s | 1970s | 1980s | 1990s | 2000s |
|---|---|---|---|---|---|
| Rainfall (mm) | 928 | 932 | 880 | 917 | 969 |
| Area irrigated by | | | | | |
| a) Canals | 8.82 | 8.93 | 8.23 | 8.24 | 7.42 |
| b) Tanks | 9.12 | 8.49 | 6.07 | 6.21 | 5.18 |
| c) Wells | 6.44 | 9.19 | 10.37 | 13.14 | 14.62 |
| d) Other sources | 0.41 | 0.35 | 0.19 | 0.17 | 0.13 |
| Net irrigated area by all sources | 24.79 | 26.36 | 24.96 | 27.75 | 27.36 |
| Gross irrigated area by all sources | 32.69 | 35.23 | 31.09 | 33.94 | 31.02 |

**Long term Trends in Yield of Predominantly Rainfed Crops**

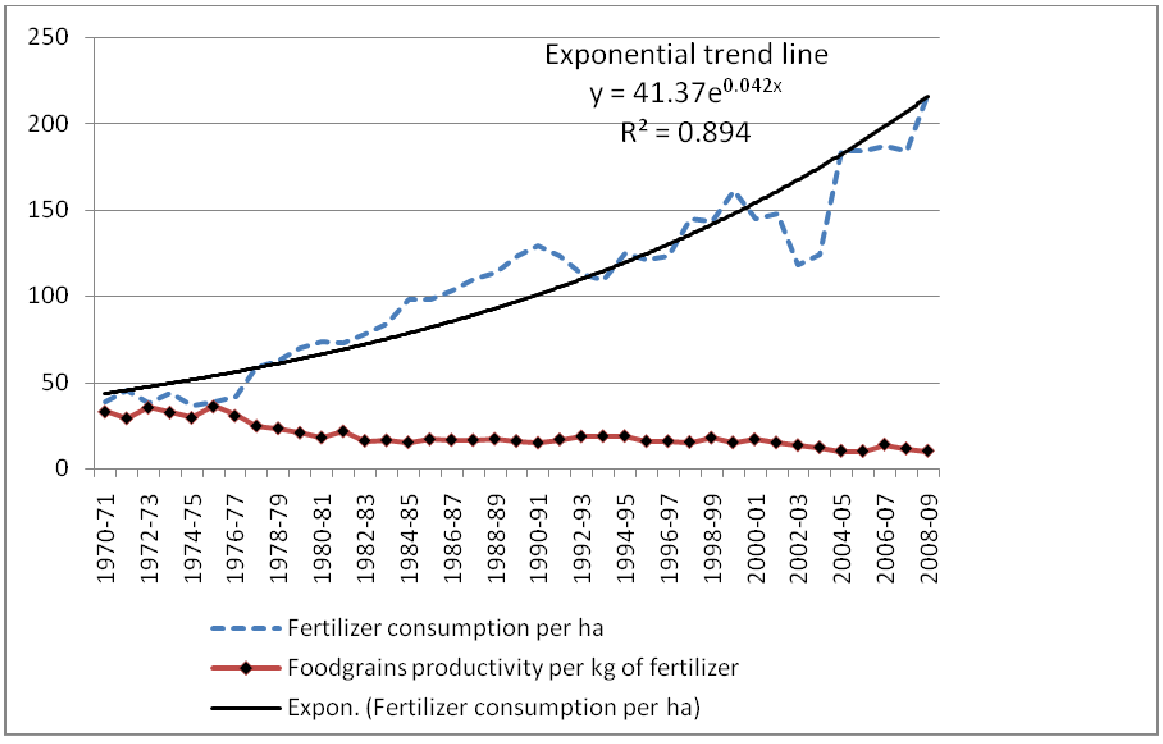
The yield trends in predominantly rainfed crops are presented in the following table. The data presented therein indicate that the yield of bajra, samai, groundnut and cotton have almost doubled over the last five decades, while the yields of other crops have not shown significant progress over this period.

Table 7. Trends in productivity of predominantly rainfed crops (Yield in kg/ha)

| | 1960s | 1970s | 1980s | 1990s | 2000s |
|---|---|---|---|---|---|
| Sorghum | 748 | 775 | 611 | 927 | 809 |
| Bajra | 608 | 667 | 614 | 973 | 1287 |
| Samai | 454 | 481 | 504 | 881 | 815 |
| Varagu | 1048 | 1090 | 1026 | 1183 | 1321 |
| Redgram | 460 | 462 | 551 | 554 | 653 |
| Blackgram | 331 | 319 | 352 | 454 | 389 |
| Cotton | 142 | 202 | 64 | 214 | 282 |
| Groundnut | 1101 | 906 | 778 | 1183 | 1830 |
| Gingelly | 317 | 321 | 283 | 318 | 481 |

**Fertilizer consumption in Tamil Nadu**

Consumption of fertilizers is an important indicator of progress in agriculture, even though increasing fertilizer consumption does not often result in commensurate increase in productivity and production. Fertilizer consumption in Tamil Nadu is showing an increasing trend in Tamil Nadu albeit with a fluctuation over the years, due to the fact that fertilizer consumption appears to be highly correlated with the rainfall and area irrigated. The total fertilizer consumption in the state has increased from 3 lakh tonnes in 1970-71 to more than 12.50 tonnes in 2008-09, which amounts to more than four folds increase in fertilizer consumption. The per ha fertilizer consumption has increased by an even faster rate with an increased from 40 kg / ha of gross cropped area to about 218 kg/ha showing more than five folds increase over the same period. In spite of the phenomenal growth in fertilizer consumption in the state the partial factor productivity of fertilizers as measured by the foodgrain productivity per kg of fertilizer applied has shown a continuous decline over the years. The partial factor productivity of fertilizers has declined from 33 kg of foodgrains per kg of fertilizer applied in 1970-71 to about 10 kg in 2008-09.



**Crop-wise growth in consumption of fertilizers**

Consumption of nitrogen, phosphorus, and potash in rice has registered a lower growth rate during 1991-2008 compared to 1971-90. The higher growth rate in consumption of all these fertilizers during 1971-90 was mainly due to the green revolution technology and the lower base in the initial years. For instance, growth in consumption of nitrogen fertilizers registered a high compound growth rate of 5.08 per cent during 1971-90 where as it was -0.24 per cent during 1991-2008. Similarly, growth in consumption of phosphorus and potash fertilizers also registered a declining growth rate in the post-liberalisation period.

For the entire period however, the growth in consumption of nitrogen, phosphorus and potash registered a positive growth rate of 1.2 per cent, 2.27 per cent and 2.42 per cent respectively from1971-2008 for rice. Growth in consumption across size groups revealed that the growth rate is relatively higher in the case of small and marginal holdings when compared to large holdings. More or less similar trends in growth in consumption of fertilizers are seen in other major cereals like ragi, jowar and maize.

Contrary to cereals, the growth in fertilizer consumption shows a different picture in major pulses like black gram and green gram. The growth in consumption of potash fertilizers has registered a higher positive growth rate during 1991-2008 when compared to the previous period. For instance, in the case of black gram, the consumption of potash has registered 14.93 per cent growth rate as compared to 6.69 per cent in 1971-90. Similar trend is seen in green gram also.

The growth rate of fertilizer consumption shows a positive trend in oilseeds like groundnut and sesamum. The consumption of nitrogen, phosphorus and potash registered a significant positive growth rate in different periods in the case of groundnut. Similarly, the sesamum has also registered a positive growth in consumption of nutrients over time.

**Table 8. Growth rate of NPK use for major cereals in Tamil Nadu (1971-2008)**

(Per cent)

| Crops | Period | < 1 ha | 1-2 ha | 2-4 ha | > 4 ha | All |
|---|---|---|---|---|---|---|
| **PADDY** | | | | | | |
| Nitrogen | 1971-90 | 22.89 | 5.01 | 4.69 | 5.17 | 5.08 |
| | 1991-2008 | -0.73 | -0.64 | -0.09 | -0.16 | -0.24 |
| | Overall (1971-2008) | 5.38 | 1.19 | 1.18 | 1.18 | 1.2 |
| Phosphorous | 1971-90 | 7.75 | 8.23 | 8.69 | 6.99 | 7.69 |
| | 1991-2008 | 1.77 | 1.26 | 1.71 | 0.62 | 0.99 |
| | Overall (1971-2008) | 2.75 | 2.42 | 2.28 | 2.27 | 2.27 |
| Potassium | 1971-90 | 11.88 | 9.84 | 8.96 | 9.35 | 9.44 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 1991-2008 | 1.07 | 0.77 | 0.41 | 1.19 | 0.91 |
| | Overall (1971-2008) | 3.05 | 2.58 | 2.47 | 2.38 | 2.42 |
| **RAGI** | | | | | | |
| Nitrogen | 1971-90 | 23.53 | 6.89 | 20 | 5.77 | 6.11 |
| | 1991-2008 | 4.17 | -20.3 | -12.3 | -49.17 | -0.56 |
| | Overall (1971-2008) | 8.13 | -1.65 | 3.48 | -5.52 | 2.31 |
| Phosphorous | 1971-90 | 23.57 | 17.52 | 21.25 | 10.76 | 11.42 |
| | 1991-2008 | 32.84 | -10.95 | -12.44 | -35.34 | 0.52 |
| | Overall (1971-2008) | 10.85 | 5.9 | 5.3 | -2.34 | 4.02 |
| Potassium | 1971-90 | 20.01 | 21.63 | 21.84 | 7.29 | 8.18 |
| | 1991-2008 | -10.12 | 5.63 | -28.9 | -45.65 | -11.23 |
| | Overall (1971-2008) | 13.21 | 7.98 | 3.66 | -0.1 | 3.32 |
| **JOWAR** | | | | | | |
| Nitrogen | 1971-90 | 40.16 | 36.66 | 5.43 | 35.2 | 10.08 |
| | 1991-2008 | 8.36 | 28.43 | 31.59 | 24.63 | 23.37 |
| | Overall (1971-2008) | 11.4 | 14.32 | 8.28 | 10.69 | 5.24 |
| Phosphorous | 1971-90 | -6.33 | 15.73 | 6.95 | 24.35 | 5.86 |
| | 1991-2008 | -6.72 | 52.6 | 34.48 | 24.51 | 18.24 |
| | Overall (1971-2008) | 7.19 | 11.64 | 7.53 | 9.53 | 4.19 |
| Potassium | 1971-90 | -3.72 | 15.63 | -6.88 | 20 | 4.68 |
| | 1991-2008 | 8.28 | 51.17 | 59.4 | 29.84 | 23.96 |
| | Overall (1971-2008) | 6.79 | 12.88 | 9.03 | 10.14 | 4.35 |
| **MAIZE** | | | | | | |
| Nitrogen | 1971-90 | 12.95 | 20.16 | 38.53 | 30.15 | 22.18 |
| | 1991-2008 | 87.7 | 7.91 | 2.41 | 3.27 | 1.79 |
| | Overall (1971-2008) | 28.7 | 22.62 | 11.69 | 12.12 | 6.93 |
| Phosphorous | 1971-90 | 13.47 | 30.7 | 62.37 | 45.63 | 34.19 |
| | 1991-2008 | 94.42 | 12.43 | 30.53 | 13.74 | 9.74 |
| | Overall (1971-2008) | 27.47 | 26.79 | 20.56 | 21.46 | 12.7 |
| Potassium | 1971-90 | 13.47 | 23.29 | 61.05 | 47.13 | 34.57 |
| | 1991-2008 | 56.64 | 29.78 | 27.72 | 6.16 | 4.42 |
| | Overall (1971-2008) | 24.04 | 29.95 | 19.26 | 21.26 | 11.98 |

Being high value commercial crops, the cotton and sugarcane registered a significant positive growth rate in consumption of different nutrients. The growth rate in consumption of nitrogen, phosphorus and potash for long staple cotton worked out to 5.47 per cent, 8.67 per cent and 5.47 per cent respectively for the period 1971-2008. Similarly, nutrient use in sugarcane registered a positive growth rate of 2.14 per cent, 3.26 per cent and 4.01 per cent respectively for N, P and K during the above period. The availability of chemical fertilizers, subsidized prices and adoption of high yielding varieties are the major reasons for such increased use of various chemical fertilizers.

**Table 9. Growth rate of fertilizer consumption for pulses in Tamil Nadu**

(Per cent)

| Crops | Period | < 1 ha | 1-2 ha | 2-4 ha | > 4 ha | All |
|---|---|---|---|---|---|---|
| **Pulses** | | | | | | |
| **BLACKGRGAM** | | | | | | |
| Nitrogen | 1971-90 | 1.07 | 13.31 | 10.66 | 7.85 | 13 |
| | 1991-2008 | 7.8 | 20.26 | 11.23 | 7.33 | 9.18 |
| | Overall (1971-2008) | 10.39 | 11.08 | 10.84 | 9.62 | 9.57 |
| Phosphorous | 1971-90 | 1.57 | 16.7 | 11.85 | 11.66 | 15.64 |
| | 1991-2008 | 6.42 | 17.73 | 6.66 | 1.96 | 2.68 |
| | Overall (1971-2008) | 10.63 | 9.62 | 11.06 | 10.55 | 9.71 |
| Potassium | 1971-90 | -100 | 8.07 | 5.9 | 6.12 | 6.69 |
| | 1991-2008 | -0.86 | 4 | 11.43 | 17.41 | 14.93 |
| | Overall (1971-2008) | 2.89 | 5.23 | 4.94 | 3.44 | 4.97 |
| **GREENGRAM** | | | | | | |
| Nitrogen | 1971-90 | 0 | 5.61 | 30.79 | 24.63 | 35.51 |
| | 1991-2008 | 9.93 | 13.67 | 6.82 | 0.14 | 0.61 |
| | Overall (1971-2008) | 8.98 | 14.69 | 20.62 | 19.97 | 20.52 |
| Phosphorous | 1971-90 | -100 | 6.33 | 11.61 | 25.35 | 24.94 |
| | 1991-2008 | 12.29 | 11.59 | 14.91 | 1.86 | 0.04 |
| | Overall (1971-2008) | 6.91 | 14.54 | 14.26 | 17.56 | 19.23 |
| Potassium | 1971-90 | -100 | 6.33 | 10.45 | 10.58 | 12.16 |
| | 1991-2008 | 15.48 | 26.24 | 36.72 | 12.12 | 16.69 |
| | Overall (1971-2008) | 2.57 | 9.56 | 9.83 | 6.51 | 9.55 |

**Table 10. Growth rate of fertilizer consumption for oil seeds**

(Per cent)

| Crops | Period | < 1 ha | 1-2 ha | 2-4 ha | > 4 ha | All |
|---|---|---|---|---|---|---|
| **GROUNDNUT** | | | | | | |
| Nitrogen | 1971-90 | 43.38 | 12.01 | 11.02 | 11.06 | 10.42 |
| | 1991-2008 | 2.81 | 9.06 | 4.51 | 5.57 | 5.62 |
| | Overall (1971-2008) | 14.57 | 5.21 | 4.52 | 4.85 | 4.51 |
| Phosphorous | 1971-90 | 47.79 | 17.32 | 15.57 | 13.72 | 14.02 |
| | 1991-2008 | -0.56 | 5.98 | 5.42 | 4.06 | 4.41 |
| | Overall (1971-2008) | 16.06 | 6.37 | 5.75 | 5.87 | 5.61 |
| Potassium | 1971-90 | 48.37 | 17.61 | 17.03 | 15.1 | 15.03 |
| | 1991-2008 | 3.96 | 10.08 | 5.97 | 2.57 | 4.2 |
| | Overall (1971-2008) | 17.11 | 6 | 5.86 | 5.15 | 5.08 |
| **SESAMUM** | | | | | | |
| Nitrogen | 1971-90 | 34.59 | 27.16 | 23.15 | 23.68 | 23.47 |
| | 1991-2008 | 5.84 | 10.89 | 6.51 | 8.7 | 8.35 |
| | Overall (1971-2008) | 12.39 | 14.66 | 12.63 | 10.84 | 10.65 |
| Phosphorous | 1971-90 | 9.95 | 15.07 | 17.06 | 13.09 | 13.46 |
| | 1991-2008 | 9.83 | 19.9 | 6.38 | 13.15 | 8.13 |
| | Overall (1971-2008) | 9.2 | 11.73 | 10.64 | 9.37 | 9.32 |
| Potassium | 1971-90 | 9.95 | 15.86 | 15.67 | 20.73 | 19.94 |
| | 1991-2008 | 43.18 | 33.89 | 20.06 | 20.78 | 14.67 |
| | Overall (1971-2008) | 10.47 | 11.23 | 11.05 | 10.24 | 9.98 |

**Table 11. Growth rate of fertilizer consumption for cotton**

(Per cent)

| Crops | Period | < 1 ha | 1-2 ha | 2-4 ha | > 4 ha | All |
|---|---|---|---|---|---|---|
| **COTTON-LONGSTAPLE** | | | | | | |
| Nitrogen | 1971-90 | -35.85 | 10.02 | 7.75 | -2.35 | 8.63 |
| | 1991-2008 | 117.94 | 127.66 | -38.24 | -6.32 | 14.12 |
| | Overall (1971-2008) | -16.03 | -6.51 | -7.31 | -0.76 | 5.47 |
| Phosphorous | 1971-90 | -33.26 | 9.71 | 10.68 | 4.04 | 12.15 |
| | 1991-2008 | 51.26 | 46.48 | -39.2 | -11.88 | 7.99 |
| | Overall (1971-2008) | -7.73 | 3.82 | -1.66 | -0.17 | 8.67 |
| Potassium | 1971-90 | -35.85 | 10.02 | 7.75 | -2.35 | 8.63 |
| | 1991-2008 | 117.94 | 127.66 | -38.24 | -6.32 | 14.12 |
| | Overall (1971-2008) | -16.03 | -6.51 | -7.31 | -0.76 | 5.47 |
| **COTTON-MEDIUM STAPLE** | | | | | | |
| Nitrogen | 1971-90 | 38.27 | 25.03 | 26.61 | 10.19 | 11.13 |
| | 1991-2008 | 5.39 | 3.78 | 2.17 | 1.78 | 2.86 |
| | Overall (1971-2008) | 9.25 | 5.46 | 6.03 | 1.9 | 2.46 |
| Phosphorous | 1971-90 | 47.46 | 25.89 | 28.64 | 16.12 | 18.59 |
| | 1991-2008 | -0.27 | 10.28 | 6.07 | 9.91 | 8.13 |
| | Overall (1971-2008) | 11.34 | 9.67 | 8.11 | 4.35 | 4.85 |
| Potassium | 1971-90 | 27.23 | 30.78 | 29.41 | 15.68 | 17.35 |
| | 1991-2008 | 33.31 | 5.77 | 9.37 | 0.54 | 8.18 |
| | Overall (1971-2008) | 9.85 | 7.22 | 7.1 | 1.96 | 3.86 |

**Table 12. Growth rate of fertilizer consumption for Sugarcane in sample farms of Tamil Nadu**

(Per cent)

| Crops | Period | < 1 ha | 1-2 ha | 2-4 ha | > 4 ha | All |
|---|---|---|---|---|---|---|
| **Sugarcane** | | | | | | |
| Nitrogen | 1971-90 | 16.55 | 21.27 | 2.25 | 3.64 | 3.18 |
| | 1991-2008 | -0.67 | 3.26 | 0.16 | 2.65 | 1.97 |
| | Overall (1971-2008) | 15.92 | 8.84 | 1.77 | 2.28 | 2.14 |
| Phosphorous | 1971-90 | 16.58 | 48.84 | 6.77 | 7.29 | 6.68 |
| | 1991-2008 | -1.55 | 2.14 | 0.41 | 0.37 | 0.49 |
| | Overall (1971-2008) | 14.56 | 18.02 | 3.61 | 3.56 | 3.26 |
| Potassium | 1971-90 | 16.2 | 50.8 | 8.44 | 11.15 | 10.11 |
| | 1991-2008 | -3.27 | 1.12 | -2.76 | 1.04 | 0.11 |
| | Overall (1971-2008) | 15.22 | 20.39 | 4.6 | 4.21 | 4.01 |

## Conclusions

The share of different sectors in the State's GDP has undergone a structural change in past decade. The growth rate in gross and net state domestic products from agricultural sector have recorded meager growth from 1999-2000 to 2008-09 compared

to other sectors of economy. Assessment of the subsector contribution of state income gains significance in this context as agriculture sector ensures household food security and brings forth equity in distribution of income and wealth which would result in the reduction of poverty. The details on compound growth rate of gross and net state domestic products from all sectors and those from agricultural sector reveal that while, the gross and net state domestic products from all sectors at constant prices have registered a growth rate of more than 6 per cent per annum, the growth rate of agricultural GSDP has been much lower at around 1.5 per cent per annum. The share of different crops in the State's Agricultural GDP shows marked increase in the share of the value of cereals in the State's Agricultural GDP. The share of cereals which was about 19 per cent during the first year of the XI plan period has shot up to 23 % during the last year of the plan period. The major crops that contributed for the increased share of cereals were paddy and maize. The share of pulses and oilseeds remained almost stagnant around 1-2 per cent 13 per cent respectively.

Growth rate in area, production and productivity of major crops during 2001-10 reveal that maize, sunflower, fruits, vegetables and plantation crops recorded significant positive growth rates area, production and productivity. Production of sugarcane recorded significant positive growth mainly due to increase in area rather than productivity improvements. Yields have increased by more than one per cent per annum in crops such as sorghum, bajra, maize, sunflower, groundnut, cotton, fruits, vegetables and plantation crops. In spite of the significant positive growth in yields, the area under sorghum, bajra, groundnut, and cotton has declined significantly. The decline in area under sorghum, bajra and groundnut has more than offset the increase in yield resulting in significant negative growth in their production. The yield trends in predominantly rainfed crops indicate that the yield of bajra, samai, groundnut and cotton have almost doubled over the last five decades, while the yields of other crops have not shown significant progress over this period.

An analysis of resource use in agriculture would explain the performance of agriculture to a large extent. Out of the gross cropped area of 58.05 lakh ha during the

latest decade, about 31 lakh ha has been under irrigation, constituting more than 50 per cent of the gross cropped area. The data on source-wise share of area irrigated to net irrigated area in Tamil Nadu show that the share of the surface irrigation sources is on continuous decline with tanks accounting for most of the decline, while the private well irrigation gaining preeminent position. The share of well irrigated area has steadily increased from about 35 per cent to more than 50 per cent in the latest decade. Also, out of the 1.8 million wells, about 0.16 million wells are defunct in the state as the water table is fast declining. The two important reasons for this are the continuous decline in tank irrigated area due to various socio-economic issues in tank management, the exhaustion of potential for expansion of canal irrigated area and the increase in area under water-intensive crops such as sugarcane, turmeric, banana and coconut. Fertilizer consumption in Tamil Nadu is showing an increasing trend in Tamil Nadu. The total fertilizer consumption in the state has increased from 3 lakh tonnes in 1970-71 to more than 12.50 tonnes in 2008-09, which amounts to more than four folds increase in fertilizer consumption. In spite of the phenomenal growth in fertilizer consumption in the state the partial factor productivity of fertilizers as measured by the foodgrain productivity per kg of fertilizer applied has shown a continuous decline over the years. Therefore, it is necessary to increase the fertilizer use efficiency in the state in order to enhance both productivity and profitability in agriculture.

In view of the importance of irrigation in increasing productivity and the constraints in further increasing the irrigation potential in the state, increasing the water use efficiency appears to be only possible strategy to enhance the productivity per unit of water as well as the overall agricultural productivity in the state.

ANNEXURE I

Estimated Share of Different Crops in Gross Domestic Product from Agricultural Sector

| | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 |
|---|---|---|---|---|---|
| **CEREALS** | | | | | |
| Paddy | **19.846** | **16.824** | **17.821** | **17.252** | **19.715** |
| Cholam | 0.740 | 0.561 | 0.670 | 0.695 | 0.616 |
| Cumbu | 0.326 | 0.235 | 0.225 | 0.206 | 0.211 |
| Barley | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Maize | 0.716 | 0.521 | 1.638 | 1.852 | 2.958 |
| Ragi | 0.429 | 0.299 | 0.293 | 0.421 | 0.407 |
| Small Millets | 0.096 | 0.068 | 0.140 | 0.093 | 0.066 |
| Other Cereals | 0.019 | 0.013 | 0.035 | 0.037 | 0.033 |
| **Total cereals** | **22.172** | **18.521** | **20.822** | **20.556** | **24.006** |
| **PULSES** | | | | | |
| Bengalgram | 0.039 | 0.036 | 0.034 | 0.040 | 0.033 |
| Redgram | 0.220 | 0.177 | 0.181 | 0.172 | 0.137 |
| Blackgram | 0.712 | 0.801 | 1.296 | 0.654 | 0.682 |
| Greengram | 0.504 | 0.469 | 0.634 | 0.381 | 0.305 |
| Masoor | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Horsegram | 0.082 | 0.073 | 0.121 | 0.077 | 0.078 |
| Other Pulses | 0.124 | 0.113 | 0.085 | 0.076 | 0.073 |
| **Total pulses** | **1.682** | **1.669** | **2.350** | **1.399** | **1.308** |
| **OIL SEEDS** | | | | | |
| Linseed | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Gingelly | 0.343 | 0.274 | 0.207 | 0.320 | 0.343 |
| Groundnut | 7.571 | 7.603 | 6.889 | 8.656 | 6.650 |
| Rape & Mustard | 0.000 | 0.000 | 0.000 | 0.000 | 0.00031 |
| Castor | 0.020 | 0.017 | 0.008 | 0.010 | 0.011 |
| Coconut (000) * | 7.710 | 6.664 | 5.917 | 6.277 | 6.501 |
| Niger Seed | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Safflower | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sunflower | 0.221 | 0.197 | 0.363 | 0.492 | 0.214 |
| Soyabeen | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Others | 0.027 | 0.025 | 0.023 | 0.025 | 0.034 |
| **Total oilseeds** | **15.891** | **14.779** | **13.407** | **15.781** | **13.753** |
| **SUGARS** | | | | | |
| Sugarcane | 5.502 | 11.503 | 10.825 | 8.599 | 6.316 |
| Gur | 6.634 | 4.501 | 4.856 | 4.418 | 6.794 |
| Others | 0.660 | 0.560 | 0.466 | 0.403 | 0.422 |
| **Total sugar** | **12.796** | **16.564** | **16.147** | **13.421** | **13.531** |
| **Fibre crops** | | | | | |
| Kapas (lint3: 1) | 0.738 | 0.598 | 0.591 | 0.703 | 0.769 |
| Jute | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sunhemp | 0.006 | 0.012 | 0.011 | 0.010 | 0.000 |
| Mesta | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Others | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

| | | | | | |
|---|---|---|---|---|---|
| **Total fibre crops** | **0.744** | **0.610** | **0.603** | **0.714** | **0.769** |
| **Drugs & Narcotics** | | | | | |
| Tea | 2.466 | 1.528 | 1.990 | 1.561 | 2.422 |
| Coffee | 0.655 | 0.547 | 0.560 | 0.579 | 0.531 |
| Tobacco | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cured Leaf | 0.106 | 0.059 | 0.078 | 0.090 | 0.082 |
| Tobacco (Stalks) | 0.009 | 0.005 | 0.007 | 0.008 | 0.007 |
| Cocoa | 0.007 | 0.006 | 0.005 | 0.005 | 0.005 |
| Others | 0.151 | 0.123 | 0.127 | 0.093 | 0.105 |
| **Total drugs and narcotics** | **3.393** | **2.269** | **2.766** | **2.335** | **3.152** |
| **Spices & Condiments** | | | | | |
| Cardamom | 0.089 | 0.040 | 0.031 | 0.034 | 0.035 |
| Chillies | 0.337 | 0.248 | 0.488 | 0.427 | 0.455 |
| Black Pepper | 0.085 | 0.065 | 0.052 | 0.027 | 0.027 |
| Ginger (Dry) (0.061) | 0.052 | 0.035 | 0.017 | 0.019 | 0.027 |
| Turmeric | 1.163 | 1.532 | 1.410 | 1.319 | 2.154 |
| Arecanut | 0.132 | 0.226 | 0.292 | 0.287 | 0.268 |
| Garlic | 0.023 | 0.020 | 0.032 | 0.033 | 0.025 |
| Coriander | 0.090 | 0.061 | 0.055 | 0.076 | 0.085 |
| Tamarind | 0.778 | 0.710 | 0.474 | 0.487 | 0.479 |
| Others | 0.026 | 0.021 | 0.025 | 0.019 | 0.020 |
| **Total spices & condiments** | **2.775** | **2.958** | **2.877** | **2.729** | **3.575** |
| **Fruits and vegetables** | | | | | |
| Banana | 12.02 | 13.59 | 14.79 | 14.60 | 12.58 |
| Cashewnut | 1.12 | 0.73 | 0.58 | 0.69 | 0.64 |
| Mango | 2.84 | 3.64 | 4.27 | 4.21 | 4.08 |
| Grapes | 0.51 | 0.61 | 0.39 | 0.37 | 0.25 |
| Apple | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sapota (Prodn Horticulture) | 1.26 | 0.82 | 0.56 | 0.66 | 0.89 |
| Lemon | 0.10 | 0.15 | 0.13 | 0.16 | 0.12 |
| Orange | 0.03 | 0.05 | 0.04 | 0.04 | 0.03 |
| Pineapple | 0.09 | 0.10 | 0.08 | 0.10 | 0.10 |
| Other fruits | 0.08 | 0.19 | 0.07 | 0.08 | 0.47 |
| Other citrus fruits | 0.40 | 0.58 | 0.56 | 0.85 | 0.76 |
| Potato | 0.26 | 0.26 | 0.26 | 0.25 | 0.26 |
| Sweet Potato | 0.04 | 0.06 | 0.05 | 0.02 | 0.02 |
| Tapioca | 5.63 | 7.79 | 5.71 | 5.61 | 4.26 |
| Papaya | 0.14 | 0.13 | 0.15 | 0.24 | 0.28 |
| Onion | 0.63 | 0.51 | 0.58 | 0.78 | 0.82 |
| Brinjal | 0.24 | 0.15 | 0.13 | 0.19 | 0.17 |
| Lady's Finger | 0.10 | 0.08 | 0.05 | 0.07 | 0.11 |
| Tomato | 0.46 | 0.33 | 0.30 | 0.71 | 0.76 |
| Other Vegetables | 1.14 | 1.42 | 0.95 | 0.98 | 0.87 |
| Cauliflower | 0.04 | 0.04 | 0.03 | 0.03 | 0.04 |
| Cabbage | 0.28 | 0.18 | 0.25 | 0.18 | 0.15 |
| Guava | 0.34 | 0.31 | 0.26 | 0.32 | 0.25 |
| Jack Fruit | 0.08 | 0.07 | 0.07 | 0.09 | 0.08 |

| | | | | | |
|---|---|---|---|---|---|
| Pear | 0.21 | 0.02 | 0.02 | 0.11 | 0.11 |
| Mushroom | 0.23 | 0.19 | 0.16 | 0.14 | 0.13 |
| **Total fruits & vegetables** | 28.29 | 31.99 | 30.42 | 31.51 | 28.20 |
| **OTHERS** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rubber | 0.50 | 0.67 | 0.76 | 0.69 | 0.70 |
| Fodder | 1.11 | 0.86 | 0.63 | 0.52 | 0.48 |
| Miscellaneous | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Misc.Food Crops | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Misc.Non-Food Crops | 0.05 | 0.04 | 0.04 | 0.04 | 0.05 |
| Grass | 0.39 | 0.31 | 0.26 | 0.24 | 0.21 |
| **Total Others** | **2.04** | **1.87** | **1.69** | **1.49** | **1.43** |
| Flowers (Prodn Horticulture) | 4.70 | 4.31 | 5.18 | 6.56 | 6.47 |
| Kitchen Garden | 0.55 | 0.59 | 0.54 | 0.54 | 0.49 |
| Flowers & Kitchen garden | 5.25 | 4.90 | 5.72 | 7.10 | 6.96 |
| BYE-PRODUCTS | | | | | |
| Straw and Stacks | 4.97 | 3.87 | 3.20 | 2.96 | 3.31 |
| Total | 4.97 | 3.87 | 3.20 | 2.96 | 3.31 |
| **Grand Total** | **100** | **100** | **100** | **100** | **100** |