GROWTH ACTIONS OF SELECTED CEREAL CROPS IN TAMILNADU STATE

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ABSTRACT: The present study examines the growth actions of area, production and yield of selected cereal crops in the Tamil Nadu state. Using the data from 1993-94 to 2007-08, the Compound Growth Rate (CGR) of area, production and yield for the selected cereal crops in the Tamil Nadu state were estimated for each period to study the growth performance of area of cultivation, production and yield of these crops. In Tamil Nadu state, the paddy holds good performances in absolute terms, among the other cereal crops are concerned. But the compound growth rate reveals that the maize was found to be positive and records a highest growth rate among other cereal corps in terms of area of cultivation, production and yield in Tamil Nadu over the study period. Despite the fact that maize was found to acquire highest in terms of growth actions of area of cultivation, production and yield among other cereal crops, it cannot serve the purpose of livelihood for majority of the population in Tamil Nadu state. Hence, the importance had given to the paddy cultivations. Besides, the study suggests that the farmers can also cultivate maize for the money-making purpose in the Tamil Nadu state that suits for the climatic conditions of the state as well.
Keywords: Cereal crops, Growth actions, Tamilnadu

Growth Actions of Selected Cereal Crops in Tamil Nadu State

Section-1: Introduction

Agriculture is the mainstay of the Indian economy. Agriculture and allied sectors, contribute nearly 22 per cent of Gross Domestic Product (GDP of India). About 65-70 per cent of the population is dependent on agriculture for their livelihood. The agricultural development is a precondition not only to provide food and nutrition security for the growing population but also inevitable for overall economic development of the state. It is essential, not only to achieve self reliance at state level but also to get household food security and to bring equity in distribution of income and wealth thereby reducing the poverty and no parity in living standard. The Indian government is keen to transform agriculture into a viable avocation in order to improve the standard of living of the farming community.

Over the years, the Indian government had invested significant amount of its resources in building a strong human and infrastructure base for a sustained development in agricultural sector in the state. Agricultural research, education and extension activities, along with supply of critical inputs such as water, fertilizers, seeds, implements and machinery, and pesticides was given adequate importance by the government so as to ensure steady growth in agriculture. Right amount of investment in technology and development of agricultural marketing has helped to considerably increase food grain production. The approach of planned manpower development, research and extension activities focusing on integrated farming system, use of bio-inputs, intensive crop protection system, scientific crop management including efficient water application methods, organic farming, vigorous hybrid crops and transgenic crops, and continuous emphasis on watershed development, dry land agriculture are the anchors of continuous increase in agricultural productivity and production. In recent years, substantial investments are being made in wasteland development, precision farming, watershed development and horticulture to spur further growth in agriculture.

Agriculture in Tamil Nadu – Present scenario

Tamil Nadu has done extremely well in irrigated agriculture particularly in paddy, cholam, cumbu, maize, sugarcane, ragi and groundnut, which are the cereal major crops of the state. All these achievements were possible only with the importance given by the government of Tamil Nadu to agriculture. In present scenario, the state has provides various assistance to the farmers that have created hope and confidence among them. Some of the major assistance are as follows; waiver of crop loan through cooperatives to the tune of Rs.7,000 crores and Co-operative loan waiver certificates was issued to 22,39,487 farmers so far, interest for agricultural loan was reduced from 9–7per cent in Cooperative Banks and the interest rate to those farmers who repay the dues in time has been further reduced from 7 to 5 per cent, crop Insurance to non loanee farmers by 50 per cent State subsidy on premium, extension of free electricity to all farmers for Agricultural pumpsets and also for 2.4 lakh farmers obtained electricity connection through self financing scheme and the new crop loan has been disbursed so far to the tune of Rs.1153 crores during 2006-07. Crop loans to the tune of Rs.1360 crores will be disbursed in the coming year 2007-08.

Over the recent past decade, the agricultural production in districts of Tamil Nadu had faced increased yields in almost all crops, especially in cereals. The state government has taken several efforts in order to increase the yield and production in the case of the major crops by mechanization of production by wide utilization of farm machinery in agriculture at subsidized prices and granted loans investment in agricultural infrastructure, supplying inputs such as fertilizers, pesticides and seed and pricing policy for several main crops, in particular cereal crops. This makes Tamil Nadu as one among the leading state that records the huge agricultural productions in cereals every year. In the present paper, the growth performance of area of cultivation, production and yield of agricultural production with special reference to selected major cereal crops was examined in the context of Tamil Nadu. The remainder of our article is organised as follows. Section-2 presents the review of related literature. Section-3 describes the methodology and data used for the analysis. Section-4 offers empirical results and discussion of the study. Concluding remarks are presented in section-5.

Section-2: Review of Literature

Jahan Mohan et al., (2005) in their study found that area and production of cereals registered a negative trend in all the agro-climatic zones with the exception of western and southern zones that exhibited significant positive trend in area and production of cotton. Ranjit Kumar et al., (2005) found that Bihar is the only state, which performed well and registered high growth rate in maize yield among the six states under the study. Punjab followed next to Bihar with nearly 76 per cent of the maize area recording higher yield but with slow growth. With respect to the stability of the growth of maize yield most of the districts were found to be unstable. The study of Gyan Prakash et al., (2006) reflects that there was in fact, some deceleration from Pre-Green Revolution Period to Green Revolution Period in the production of food grains, but further, it has deteriorated more in the Post–Economic Reform Period and the area shrinks four times from pre-green revolution Period to the Green Revolution Period. The study suggests that the future efforts should be made to stabilize and to expand the area of food grains also with increasing the yield level.

Toor et al., (2006) estimates the growth rates of production of selected commodities during 1990-91 to 1995-96 and 1996-97 to 2003-04. The result indicates the declining trend in case of total food grains cereals pulses, wheat, sugarcane, oilseeds, milk, egg and fisheries. But the growth rates ware observed negative in case of oilseeds cotton and pulses, which indicated decline in their production after initiation of globalization process. Kakali Manjumdar and Partha Basu (2006) investigates the growth performance of food grains production in West Bengal during the period 1970-71 to 1999- 2000 based on kink and simple form of the linear, exponential, log quadratic, parabolic and logistic functions. The study results reveal that the grain productions are found to be varying across the districts as per different growth functions are concerned. Meenakshi and Gayathri (2006) confirm that change in the interaction between change in mean area and yield variance was an important contributor to the cereals production instability in Tamil Nadu state. The study suggests that the efforts should be made to stabilise cereals production in the state. The study also indicates that there is a need for further research on the cereals crops in the state of Tamil Nadu. Shadmehri (2008) examine the trends in area, production and yield of Iran's agricultural production especially food grains for pre and post-revolutionary and pre and post reform periods. Compound growth rates of area, production and yield were estimated by fitting semi-log trend equation using data for the period 1970-1999. Besides, the study employed component analysis model for estimating the decomposition of output growth of selected major crops. The result reveals that performance of agricultural sector was slightly better during the pre-revolutionary period than that of post-revolutionary period.

From the existing literature, it was clear that the studies related to the growth performance of agricultural crops in India are found to be meager. To the best of our knowledge, there was only a few studies available on growth performance of cereals crop with special reference to Tamil Nadu state that experience a maximum production among the states in India.

Section-3: Methodology and Data

In the present study, Compound Growth Rate (CGR) of area, production and yield for the selected cereal crops in the Tamil Nadu state were estimated for each period to study the growth in area, production and yield of these crops. The Compound Growth Rates are found very convenient for any comparison of growth between two period and two crops. It seems more appreciable to analyse the movement of agricultural crops in terms of compound rather than linear growth rate (Dandekar, 1980, Shadmehri, 2008). Hence, the compound growth rates are computed for the selected cereal crops in Tamil Nadu state. The Compound Growth Rate (CGR), are usually estimated by fitting a semi-log trend equation of the form:

$$\log Y_t = \alpha + t\beta_t + \varepsilon_t \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

Y_t: Area, production and yield of selected cereals in years '*t*' respectively.

t : Year which takes value 1, 2……n

α & β are the parameters to be estimated, and

ε = random error term.

Equation (1) was estimated using Ordinary Least Squares (OLS) technique. The t-test was applied to test the significance of β. This equation is generally used on the consideration that change in agricultural output in a given year would depend upon the output in the preceding year (Minhas, 1996; Dandekar, 1980; Singh and Rai, 1997; Deosthali and Chandrahekhar, 2004 and Shadmehri, 2008).
Compound Growth Rate was then estimated by using the following equation:

*CGR = [(Antilog of β - 1)*100]* …….. *(2)*

The study considers the yearly database for the five major cereal crops to examine the growth performance of area of cultivation, production and yield in Tamil Nadu. The five major crops under examination include Paddy, Cholam, Cumbu, Ragi and Maize. In view of the limitation of the data, the present study is restricted for period of 15 years. The data was comprised for the period 1993-94 to 2007-08. The necessary data for the selected cereals crops was purely based on secondary sources and it was collected from various issues of Statistical Hand Book of Tamil Nadu. Also, the data was gathered from the unpublished sources of Department of Economics and Statistics, Chennai.

Section-4: Empirical Results and Discussions

The present study examines the growth performance of area of cultivation, production and yield of selected cereal crops in Tamil Nadu State. Table-1 reports the total area under cultivation of cereal crops for the period of 1993-94 to 2007-08. It reveals that 2306000 hectares of land was under paddy cultivation in 1993, followed by 506000 hectares under cholam, 213000 hectares under cumbu, 158000 hectares under ragi and 38000 hectares under maize. The trend of area under cultivation of paddy is seems to be volatile over the study period. During the last four year periods, i.e. 2004-05 to 2007-08, the area cultivated for cholam, cumbu and ragi were seems to have declining trend. While in case of maize, the table shows the considerable positive trend among other crops over the study period. Still, paddy is found to acquire maximum area of cultivation among the other cereal crops over the 1993-94 to 2007-08 periods.

Table-1 Area under Cereal Crops in Tamilnadu during 1993-94 to 2007-08

[In Hectares]

Year	Paddy	Cholam	Cumbu	Maize	Ragi
1993-94	2306000	506000	213000	38000	158000
1994-95	2229000	432000	192000	47000	145000
1995-96	1951000	383000	172000	47000	122000
1996-97	2174000	395000	165000	49000	111000
1997-98	2261000	380000	169000	58000	107000
1998-99	2275000	365000	154000	55000	120000
1999-00	2164000	351000	158000	88000	123000
2000-01	2080000	331000	129000	81000	127000
2001-02	2060000	317000	125000	73000	125000
2002-03	1516537	319607	102020	121057	104286
2003-04	1396651	405607	158851	118439	160159
2004-05	1872822	376739	97608	189893	108845
2005-06	2050455	316274	81925	202830	99549
2006-07	2228088	255809	66252	215767	90253
2007-08	1789170	283526	59798	223428	93701

Source: Department of Economics and Statistics, Chennai.

Table-2 reports the total production of selected cereal crops in TamilNadu for the years 1993-94 to 2007-08. Table result reveals that maize is found have consistent positive trend over the study periods. In case of cumbu, the production trend seems to be decline. While in case of cholam, the production seems to be highly volatile. The ragi is found to have good pace in its production in 1990s, but seem to have downtrend in the following years. The paddy looks upswing and downswings, but seems to be consistent after the year 2004. Still, it found to hold its first place in production as compare with other cereals.

Table-2 Production of Cereal Crops in Tamilnadu during 1993-94 to 2007-08

[In Tonnes]

Year	Paddy	Cholam	Cumbu	Maize	Ragi
1993-94	6750000	486000	238000	61000	331000
1994-95	7559000	490000	231000	73000	285000
1995-96	5290000	330000	189000	75000	221000
1996-97	5805000	362000	195000	80000	191000
1997-98	6894000	378000	212000	95000	218000
1998-99	8141000	369000	206000	88000	241000
1999-00	7532000	346000	241000	137000	246000
2000-01	7366000	306000	170000	140000	259000
2001-02	6584000	275000	153000	118000	235000
2002-03	3577108	210793	88682	191646	140169
2003-04	3222776	245933	172341	176381	250992
2004-05	5061622	252063	124300	294717	154085
2005-06	5209433	231449	94799	241217	131915
2006-07	5456782	228165	89645	231462	129861
2007-08	5039954	247836	85840	810057	175944

Source: Department of Economics and Statistics, Chennai.

Table-3 reports the yield of selected cereal crops in Tamil Nadu for the years 1993-94 to 2007-08. It reveals that all the selected cereal crops are found to follow the consistent or steady trend over the study periods. But, still yield of paddy looks to be solid in terms of yield among the others.

Most importantly, Table-4 depicts the Compound Growth Rate (CGR) of Area of cultivation, Yield and Production of selected Cereal Crops in Tamil Nadu state for the years 1993-94 – 2007-08. Table result shows that, among cereal crops, maize have recorded the positive and highest growth rate of 36.45 % per annum, which was evidently contributed by the high profitability from maize in Tamil Nadu. It was found to be statistically significant at one per cent level. Other selected cereal crops recorded decline in area as evident from negative rate of growth per annum. The largest decline in area has been recorded by ragi at the rate of -42.45% per annum followed by Cumbu, Cholam and Paddy. In the case of yield of selected Cereal Crops, the table result reveals that Cumbu and Cholam recorded the significant positive growth rates of 1.15% per annum respectively.

Table-3 Yield of Cereal Crops in Tamilnadu during 1993-94 to 2007-08

[Kg/Hectares]

Year	Paddy	Cholam	Cumbu	Maize	Ragi
1993-94	2927	960	1121	1618	2095
1994-95	3392	1134	1203	1585	1970
1995-96	2712	860	1095	1598	1818
1996-97	2671	916	1184	1640	1710
1997-98	3050	993	1257	1636	2036
1998-99	3579	1011	1339	1587	2004
1999-00	3481	984	1531	1609	2004
2000-01	3541	923	1318	1717	2043
2001-02	3196	866	1223	1624	1883
2002-03	2359	660	869	1583	1344
2003-04	2308	612	1085	1489	1567
2004-05	2703	669	1273	1552	1416
2005-06	2541	732	1157	1189	1325
2006-07	2338	891	1366	1072	1438
2007-08	2817	874	1436	3626	1878

Source: Department of Economics and Statistics, Chennai.

However, in the case of Cholam and Ragi, the evidences provide negative growth rate of -5.37% per annum respectively. This is followed by paddy that registered lowest negative growth rate of -3.61% per annum in case of yield. Besides, the growth performance of production reveals that maize has recorded the positive and significant growth rate of 67.10 % per annum, which was evidently contributed by the high profitability from maize in the Tamil Nadu state. The largest decline in production has been recorded by Cumbu at the rate of -81.80% per annum followed by Cholam, Paddy and Ragi. The state government has taken several efforts during the study period in order to increase the yield and production in the case of the major cereal crops by mechanization of production by wide utilization of farm machinery in agriculture at subsidized prices and granted loans investment in agricultural infrastructure, supplying inputs such as fertilizers, pesticides and seed and pricing policy for several main crops. But the analysis over the study period provides evidence that only the maize has recorded positive and highest growth rate per annum in terms of area and production in Tamil Nadu state. Similarly, in case of yield of major selected cereal crops, the analysis reveals that maize has registered the positive and significant growth performance along with cumbu, which was evidently contributed by the high profitability from maize and cumbu in the Tamil Nadu state. In sum, the paddy holds good performances in Tamil Nadu state in absolute terms, among the other cereal crops are concerned. But the Compound Growth Rate (CGR) reveals that the maize was found to be positive and records a highest growth rate per annum among other cereal corps in terms of performance of area of cultivation, yield and production in Tamil Nadu over the study period. Besides, the Cumbu provides positive and significant growth rate per annum only in case of performance of yield. Despite the fact that maize was found to acquire highest in terms of area of cultivation and production among other cereal crops, it cannot serve the purpose of livelihood for majority of the population in the Tamil Nadu state. Hence, the importance had given to the paddy cultivations. Besides, the study suggests that the farmers can also cultivate maize for the money-making purpose in the Tamil Nadu that suits for the climatic conditions of the state as well.

Table-4: Compound Growth Rates of Area, Yield and Production of selected Major Cereal Crops in Tamil Nadu (1993-94 – 2007-08)

(per cent)

Crops	Area	Yield	Production
Cholam	-6.67*	-5.37*	-71.15*
Cumbu	-16.82*	1.15*	-81.80*
Maize	36.45*	1.15*	38.35*
Paddy	-3.61*	-3.61*	-51.02*
Ragi	-42.45*	-5.37*	-10.25*

Source: Based on authors own estimation. * -indicates significance at 1 per cent level.

Section-5: Conclusion

The present study examines the growth performance of area, production and yield of selected cereal crops in the Tamil Nadu state. Using the data from 1993-94 to 2007-08, the Compound Growth Rate (CGR) of area, production and yield for the selected cereal crops in the Tamil Nadu state were estimated for each period to study the growth performance of area of cultivation, production and yield of these crops. In Tamil Nadu state, the paddy holds good performances in absolute terms, among the other cereal crops are concerned. But the compound growth rate reveals that the maize was found to be positive and records a highest growth rate among other cereal corps in terms of area of cultivation, production and yield in Tamil Nadu over the study period. Despite the fact that maize was found to acquire highest in terms of growth performance of area of cultivation, production and yield among other cereal crops, it cannot serve the purpose of livelihood for majority of the population in Tamil Nadu state. Hence, the importance had given to the paddy cultivations. Besides, the study suggests that the farmers can also cultivate maize for the money-making purpose in the Tamil Nadu state that suits for the climatic conditions of the state as well.

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