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Supply response of cassava in Tamil Nadu

K.R. ASHOK
Department of Agricultural Economics, Tamil Nadu Agrl. University, Coimbatore - 641 003, Tamil Nadu

Abstract: **Cassava is gaining importance as an industrial crop in Tamil Nadu. In this context the present study was undertaken to estimate the supply response and to study the growth rate in area, production and productivity of cassava in Tamil Nadu. There was positive compound growth rate (CGR) of area in western zone, southern zone, Cauvery delta zone and north western zone, while the CGR of area declined in north eastern zone, high rainfall zone and hilly zone. CGR of production increased in all zones except in hilly zone and north eastern zone. Highest increase in rate of growth in productivity was observed in western zone with 15.95 per cent per annum. State as whole, there was positive compound growth rate in area, production and productivity with 2.47, 3.68 and 1.19 per cent respectively. Lagged area and lagged price had significant positive influnce on cassava area while the influence of rainfall and lagged yield was not significant. The supply response model for cassava shown that for every increase of 0.18 rupees per quintal in tuber price in the previous year, the current arae increased by one hectare. Similarly for an increase of 0.58 hectare in the area planted in the previous year the current area increased by one hectare.**

Key words : Cassava, Supply response and Growth rate.

Introduction

Cassava is the most widely cultivated root crop in tropics and is grown across broad range of agro-climatic conditions. One of the principal characteristics of cassava is its ability to produce economic yield in relatively marginal rainfall and soil conditions. Cassava is well suited to small farm production systems. Cassava today is very much a commercial crop. The reason cassava is so widely grown is not because of its nature as a paramount subsistence crop, but because it is a cash crop (Lakshmi *et al.* 2000). Kerala and Tamil Nadu are the major cassava producing states in India. Though the poor people in Kerala use cassava as a staple food, it is a major industrial crop in Tamil Nadu and gaining importance in Andhra Pradesh. Consequent to the increase in per capita income, consumption pattern is changing in the rural areas and it is likely that in future the importance of cassava as a food crop is likely to diminish and its importance as a raw material for industries would increase. In this context the present study was undertaken to estimate the supply response and to study the growth rate in area, production and productivity of cassava in Tamil Nadu.

Materials and Methods

There are number of studies on estimation of supply response for different crops in Tamil Nadu. In an earlier study Rajagopalan (1967) concluded that the regional differences in supply response arose mainly because of differences in the degree of industrialization, differences in source of irrigation, differences in the degree of dependence on rainfall and difference in application of government policy of procurement in different regions. His study indicated that the price elasticities of acreage were insignificant for most food crops. The rice acreage response elasticities estimated by Ramasamy (1979) revealed that the area under sugarcane did not have a significant impact on rice acreage even though sugarcane and rice are cultivated under similar production environments - minor and major surface irrigation projects. Lagged rice acreage and rice price were found to have significant positive impact on rice acreage. A study on

Table 1. Area, production and productivity of cassava in the major producing districts of Tamil in 2001-02

Districts	Area (ha)	Production (tonnes)	Productivity (tonnes ha^{-1})
Salem	29566	1005826	34.02
Namakkal	22265	1135633	51.00
Dharmapuri	14705	470041	31.97
Villupuram	10771	338008	31.38
Kanyakumari	7817	203247	26.00
Erode	5873	235223	40.05
Trichy	5715	30038	52.50
Cuddalore	5129	194317	37.89
Perambalur	2292	121827	53.15
Dindigul	565	21726	38.45
Others	3307	127160	38.45
Total	108005	4153046	38.45

Table 2. Estimated compound growth rate (CGR) of area, production and productivity of *tapioca* i Tamil Nadu*

Zones**	Area	Production	Productivity
North Eastern Zone	-3.42	-3.48	-0.06
North Western Zone	3.65	4.43	0.75
Western Zone	16.26	12.96	15.95
Cauvery Delta Zone	4.98	6.33	1.29
Southern Zone	6.06	9.89	3.60
High Rainfall Zone	-1.70	3.96	5.76
Hilly Zone	-1.59	-3.65	-2.09
State	2.47	3.68	1.19

* Data pertains to 1990-91 to 2001-02

** NEZ = Kancheepuram, Thiruvallur, Cuddalore, Villupuram, Vellore and Thiruvannamalai, NWZ = Salem, Namakkal and Dharmapuri, WZ = Coimbatore and Erode, CDZ = Trichy, Karur, Perambalur, Thanjavur, Thiruvarur and Nagapattinam, SZ = Madurai, Pudukottai, Theni, Dindugal, Ramnad, Virudunagar, Sivagangai, Thirunelveli and Thoothukudi, HRZ = Kanyakumari and HZ = Nilgiris

Table 3. Supply response (area) of Cassava in Tamil Nadu

Variables	Coefficient	Standard error	t-value	Level of significance
Constant	2.6423	2.6806	0.9857	
Lagged price	0.1777	0.0896	1.9827	***
Lagged area	0.5750	0.2560	2.2466	**
Lagged yield	0.2837	0.5358	0.5296	
Rainfall	0.0475	0.2389	0.1988	
R^2	0.68			*
				(F statistic)

*, **, *** Significant at 1, 5 and 10 per cent respectively.

farm supply response of paddy in Andhra Pradesh revealed that acreage response of paddy to rainfall (0.55), irrigation (0.56) and relative yield of paddy (0.72) were higher than that of paddy price (0.33), as indicated by the respective long run elasticities (Reddy, 1989). The area under groundnut showed significant positive response to price, lagged area and rainfall while

showed a negative response to imports (Subhashini, 2001). Through dynamic supply response analysis using Nerlovian Expectation-cum-adjustment model, it was observed that the groundnut production in Karnataka responded positively to own price and negatively to rainfall risk and fertilizer price (Dixit, Hiremath and Singh, 1998). Suresh Kumar (2001) estimated elasticities of output supply through profit function approach. The output supply with respect to own prices of sorghum, groundnut, sesame and blackgram were found to be elastic (with elasticities more than one), while the supply elasticities with respect to the prices of competing crops and wage rate were found to be negative. Wage rates were found to have stronger negative impact on the supply of these crops since most of these crops are labour-intensive and/or there is very limited mechanization in the cultivation of these crops. In the present study the supply response of cassava in terms of area was estimated using the following log-log model:

$$At = f(P_{t-1}, A_{t-1}, Y_{t-1}, RF)$$

where,

A = Area under cassava in hectare
P = Price in rupees per quintal
Y = Yield in tons per hectare
RF = Rainfall in mm
t = Year

The compound growth rate was worked out from the estimated long term trends. The long term trend in area, production and productivity of tapioca was estimated using the following semi-log model:

$$Y = ab^t$$

where

Y = the are of production or productivity
a = constant
b = slope coefficient

The compound growth rate (CGR) = (Anti log of b-1) x 100

The data source

The supply response model was estimated using data from the period 1985-86 to 2001-2002 and long term trend in area, production and productivity of tapioca in Tamil Nadu were estimated using data from 1990-91 to 2001-02. The data were collected from the various issues of 'Tamil Nadu - An Economic Appraisal' and 'Season and Crop Report of Tamil Nadu'.

Results and Discussion

i. Area, production and productivity in major tapioca producing districts

Salem, Namakkal, Dharmapuri and Villuppuram are the major tapioca producing districts in Tamil Nadu with more than ten thousand hectares according to the data available for 2001-02. In terms of productivity, Salem and Namakkal top the list with more than ten lakh tonnes of production in 2001-02. The highest productivity of more than fifty tonnes per hectare is recorded in Perambalur, Trichy and Namakkal districts. The details of the area, production and productivity are given in Table 1.

ii. Agro-climatic zone-wise compound growth rate in area, production and productivity of tapioca

The compound growth rate (CGR) in area, production and productivity of tapioca in the seven agro-climatic zones in the state from 1990-91 to 2001-02 are given in Table 2. There was positive CGR of area in western zone (16.26), southern zone (6.06 per cent), Cauvery delta zone (4.98) and North western zone (3.65), while the CGR of area declined in north eastern zone (-3.42), high rainfall zone (-1.70) and hilly zone (-1.59).

CGR of production increased in all zones except in hilly zone (-3.65) and north eastern zone (-3.48), with a maximum increase of 12.96 per cent in western zone and 9.89 per cent in southern zone. Another significant increase in production was in Cauvery delta zone (6.33).

Highest increase in rate of growth in productivity was observed in western zone with

15.95 per cent increase. This may be due to the progressive increase in area under irrigated tapioca in this region. There is negative growth in productivity in north eastern and hilly zones.

In the state as whole, compound growth rate in area, production and productivity were 2.47, 3.68 and 1.19 per cent per annum respectively.

iii. Supply response of cassava in Tamil Nadu

The acreage planted would give a better indication of the farmer's intentions than production as he has considerably greater control over this variable. Therefore most supply response studies in underdeveloped agriculture, where there is high probability of crop failure, used acreage planted as the dependant variable. The estimated coefficients of the supply response model are given in Table 3.

Lagged area and lagged price had significant positive influence on cassava area while the influence of rainfall and lagged yield were not significant. For every increase of 0.18 rupees per quintal in tuber price, in the previous year, the current area increased by one hectare. Similarly for an increase of 0.58 hectare in the area planted in the previous year the current area increased by one hectare.

Conclusion

The cassava area shown positive compound growth rate (CGR) in western zone, southern zone, Cauvery delta zone and north western zone, while the CGR of area declined in north eastern zone, hilly rainfall zone and hilly zone. CGR of production increased in all zones except in hilly zone and north eastern zone. Highest increase in rate of growth in productivity was observed in western zone with 15.95 per cent increase. In the state as whole, there was positive compound growth rate in area, production and productivity. Lagged area and lagged price had significant positive influence on cassava area while the influence of rainfall and lagged yield were not significant.

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