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Research Article

Acreage Response of Rice and Maize in Andhra Pradesh

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ABSTRACT

This study was conducted to analyze the acreage response of rice and maize in Andhra Pradesh from 1996-97 to 2015-16 using Nerlovian lag adjustment model. The results of the study showed that the acreage response of rice showed that the coefficient of lagged price and rainfall was positive and significant which explained the changes in area and variation in prices moved in the same direction. In the case of maize, yield had exerted a positive and significant effect on area allocation.

Keywords: *Acreage, Nerlovian model, Rice, Maize*

INTRODUCTION

Agriculture plays an important role in the livelihoods of people as 63 per cent of the population in Andhra Pradesh live in rural areas and depend on agriculture and related livelihood opportunities. Agriculture Sector contribute 27 per cent share in State GDP. The agriculture plays an important role not only in the economy but also for achieving the food security for the state and also for the country. Our main challenges are growing water scarcity, degrading natural resources like land and decreasing per capita availability of land and water resources. The supply response of crop or acreage response of agricul-tural crop is one of the important procedure tools predicting crop production. The response of agricultural production to relative prices is, thus, crucial to understanding the effects of price policies and policy reforms that influence agricultural prices on agricultural output. The policies outlined above have been employed either to spur agricu-ltural production and efficiency or to achieve some social goal, or both. However, most occasions of their use have been without prior knowledge of the extent of their effect on output. To improve productivity various measures have been taken in our country. Support price is one of these measures. It is not known clearly whether this price does influence the resource allocations.

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Farmers supply response assumes greater significance for National crop planning. As such the study of farmers supply response is of considerable importance for devising a suitable policy for agricultural sector of any economy. If the time series study shows that farmers are responsive to the relative prices, in allocating their resources among different crops they grown, then the desired allocation of inputs could be obtained by using price as an incentive to farmers. Economists and policy makers have been advocating the provision of price incentives to farmers to increase their production. Empirical studies of supply response to price changes provide the basic material for the consideration of price incentives to boost agricultural production. The measures devised should take into account the present economic and technological relationships and the farmers' reactions to price fluctuations or the changes in price policies. Estimation of supply response also plays a significant role in providing the basis for the long run price relationships needed in all agricultural planning. When supply response estimates are available for a number of commodities, estimates of cross elasticities of supplies can also be obtained. Farmers would be interested in developing guidelines to help them in deciding about their total production of a particular commodity within the framework of their physical and economic limitations. Specifically, they may desire to know the quantities they should produce at certain prices if they have to maximize profits.

MATERIALS AND METHODS

Marc Nerlove (1958) had attempted to estimate the supply response of acreage of wheat, corn and cotton in U.S.A for the period 1909 to 1932. He had postulated a price expectation model in which he assumed that acreage was not a function of previous year's price alone, but also of this year's expected price. His hypothesis was that the farmers react not to previous year's price, but rather to the price they expect, and this expected price depends only to a limited extent on previous year's price. Each year, farmers revise the price they expect to prevail in the coming year, "in proportion to the error they made in predicting price during current year". He denoted the price expected during current year by P*t and the price expected in previous year by P*t-1. He further assumed that the proportion of error by which the farmers assumed that the proportion of error by which the farmer revise their expectation to be constant. B is the coefficient of expectation, which lies between zero and one.

$$A_t = b_0 + b_1 P_{t-1} + b_3 Y_{t-1} + b_4 R_t + b_5 P^c_{t-1} + b_6 Y^c_{t-1} + b_7 X_{t-1} + \mu_t$$

Where,

A_t = Area under the crop studied in '000 ha in the current year

X_{t-1} = Area under the crop studied in '000 ha lagged by one year

P_{t-1} = Farm harvest price of the crop studied (Rs/Q) lagged by one year

P^c_{t-1} = Farm harvest price of the competing crop (Rs/Q) lagged by one year

Y^c_{t-1} = Yield of the crop studied (Kg/ha) lagged by one year

R_t = Rainfall in mm

The best fits are selected on the basis of the coefficient of multiple determination (R^2), absence of the multicolliniarity, autocorrelation and the significance of explanatory variables and they are taken up for discussion.

RESULTS AND DISCUSSION

Acreage responses for rice in Andhra Pradesh

The explanatory variables included in the area response model of rice were lagged area, lagged yield, lagged yield of competing crop, lagged price, price of competing crop and rainfall (Table 1). The multiple linear regression applied explained 70 per cent variation in area under rice in the State. The coefficient of lagged price was positive and significant which explained the changes in area under rice and variation in prices moved

in the same direction. It was noticed that the preceding year's area of the crop dominated the farmers' decision making process. The regression coefficient of rainfall was found to be positive and significant and its role in increasing area under rice crop. The lagged price of the competing crop showed significant negative influence on acreage of paddy. Mythili (2007) also found significant response of area under paddy to total rainfall.

Table 1: Acreage response equations of rice in Andhra Pradesh (period 1996-97 to 2015-16)

Particulars	Rice
Constant	302242.94 (805186.39)
Lagged farm harvest price rice (P_{t-1})	573.19*** (293.15)
Lagged yield of rice (Y_{t-1})	6.18 (187.35)
Rainfall (R_t)	63.28** (16.48)
Lagged farm harvest price of bengalgram (P^c_{t-1})	-287.05*** (141.26)
Lagged yield of bengalgram (Y^c_{t-1})	-124.7 (182.02)
Lagged area of rice (X_{t-1})	0.625** (0.17)
R^2	0.70**
d-statistic	1.92

Figures in parentheses indicate standard errors
**Significant at 1% level
*Significant at 5% level
***Significant at 10% level

Acreage response for maize in Andhra Pradesh

Area response function had explained 94 per cent of the variation in maize (Table 2). Price of maize had not exerted any influence on area, but lagged yield had exerted a positive and significant effect on area allocation. This is quite obvious when a crop is not price-responsive and if the farmer had received a bumper harvest in the preceding year, he would try to allot more area under the crop.

Table 2: Acreage response equations of maize in Andhra Pradesh (period 1996-97 to2015-16)

Particulars	Maize
Constant	-145455.21* (60563.98)
Lagged farm harvest price maize (P_{t-1})	4.49 (155.38)
Lagged yield of maize (Y_{t-1})	19.4* (7.42)
Rainfall (R_t)	2.71 (2.91)
Lagged farm harvest price of groundnut (P^c_{t-1})	62.7 (49.32)
Lagged yield of groundnut (Y^c_{t-1})	26.43 (28.63)
Lagged area of maize (X_{t-1})	0.12 (0.30)
R^2	0.94**
d-statistic	1.55

Figures in parentheses indicate standard errors
**Significant at 1% level
*Significant at 5% level
***Significant at 10% level

CONCLUSION

The regression coefficient of acreage response of rice showed the coefficient of lagged price and rainfall and in the case of maize lagged yield were influencing the current acreage under the crops. This indicated that the farmers are responsive to the price changes in acreage allocation.

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