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Maize Crop Production Elasticities and Returns to Scale of Tribal Agriculture in I.T.D. as of Telangana Region

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ABSTRACT

Agriculture is a backbone of Indian economy. Production cost plays an important role in the decision making process of the farmers. In general, at a given level of prices, a farmer can increase his farm income in two-ways, either by increasing the production or by reducing the cost of production. Production elasticities and related particulars of different input factors in maize on different sizes of tribal farms in Khammam and Warangal districts are presented in Table 5.23. In Khammam and Warangal district, it was observed from the values of co-efficients of multiple determinations that 0.92, 0.89, 0.96 and 0.93 and 0.95,0.75 ,0.95 and 0.92 percent of variation in output was explained by the variables selected in the functions of small, medium, large and pooled farms respectively.

Key words: Maize, Elasticities, Agriculture, Economy.

INTRODUCTION

India is one of the countries having the largest concentration of tribal population in the world. According to 2011 census the population of the scheduled tribes in the country were 8.43 crores, constituting about 8.2 per cent of the total population indicating approximately one tribesman for every fourteen Indians. Majority of tribal population is concentrated in nine states i.e. Madhya Pradesh, Bihar, Orissa, Gujarat, Rajasthan, Assam, Maharashtra, West Bengal and Andhra Pradesh[2,3]. Though 80 per cent of tribals depend on agriculture as the main source of livelihood, they still remain below the poverty line. Each tribal group possesses its own strong socio- economic and cultural ethos[6]. There are some tribal groups which are, even now, at food-gathering stage, while others practice shifting or 'Jhum' cultivation[1]. Some tribal areas are not easily accessible while in some others small scale industrialization has brought a change in their way of life.

INTEGRATED TRIBAL DEVELOPMENT AGENCY, WARANGAL AND KHAMMAM DISTRICTS

The Integrated Tribal Development Agency (ITDA) came into existence on 1st October 1979 with headquarters at Eturnagaram, Warangal district and in Khammam district ITDA was formed on ITDA head quarter under the Society Registration Act: 1974-75 1st at Khammam, 1974-75 Shifted to Palwancha and 1979 Shifted to Bhadrachalam 1993. These two ITDAs were functioning with a view to implement developmental programmes in sectors like education, irrigation, agriculture, animal husbandry, cooperation, industries, medical and health etc. The overall objective of the ITDA is the development of tribals in their economic, social and cultural aspects. The agency prepares separate action plans for each year.

MATERIALS AND METHODS

Selection of District

Warangal and Khammam districts were selected purposively. The Integrated Tribal Development Agency has been operating in these districts for more than 30 years. Warangal district has considerable tribal population of about 7.99 lakhs which constitutes 30 percent of total population in the district and Khammam district has considerable tribal population of about 11.44 lakhs which constitutes 34 percent of total population in the district. Comparative Among the two districts high tribal population exists in Khammam district. This ranks first in the state in tribal population.

Selection of mandal

The area of operation of Integrated Tribal Development Agency in Warangal district extends to 13 mandals. Out of 13 mandals 3 mandals viz., Eturnagaram, Tadwai and Mangapet were selected for the detailed study because Tribal Development programmes were well initiated in these 3 mandals extending to 64 villages in Eturnagaram, 21 villages in Tadwai and 33 villages in Mangapet mandals. Thus out of 396 villages covered by Integrated Tribal Development Agency in the entire district, 118 villages (24.36%) in these 3 mandals were covered by the study.

The tribal population is considerably large in these three mandals when compared to other mandals. Out of the total tribal population of 5, 30,656. Eturnagarm, Tadwai and Mangapet have population of 11,776, 11876 and 11560 respectively.

In Khammam district 3 mandels viz., Palwancha, Mulkalapally and VRC puram were selected for the detailed study. Tribal Development programmes were well initiated in these 3 mandals extending to 53 villages in Palwancha, 34 villages in Mulkalapally and 37 villages in VRC puram mandals. The tribal population is considerably large in these three mandals when compared to other mandals. Out of the total tribal population of 7,65,565 in the district,Palwancha, Mulkalapally and VRC Puram have population of 29,368, 21,417 and 16,112 respectively.

Selection of villages

From each mandal two villages were selected at random making the total of 12 villages from two districts.

Selection of farmers

The farmers in each selected village were arranged in descending order taking the size of holding into consideration. They were grouped into suitable categories. The farmers were selected at random depending upon his availability. The size groups are follows:

Small   :   0-1 ha.wet land or 0-2.5 ha. dry

Medium   :   1-2 ha.wet land or 2.5-5 ha. dry

Large   :   2 ha above wet or 5 ha. dry

The number of farmers was taken as 9 under each category randomly. Hence, the total sample size was 108.

Resource-use efficiency was estimated by developing a functional relationship between output and the inputs used in the production of that output. For this purpose, Cobb-Douglas production function model of the following form was fitted.

$Y = a\, x_1^{b1}\ x_2 b^2 \dots x_n^{bn}$

Where,

Y	=	Output factors
$x_1, x_2 \dots x_n$	=	Input factors
$b_1, b_2 \dots b_n$	=	Regression coefficients or production elasticities
a	=	Intercept

Production Elasticities and Returns to Scale from maize

Production elasticities and related particulars of different input factors in maize on different sizes of tribal farms in Khammam and Warangal districts are presented in Table 01. In Khammam and Warangal district, it was observed from the values of co-efficients of multiple determinations that 0.92, 0.89, 0.96 and 0.93 and 0.95,0.75 ,0.95 and 0.92 percent of variation in output was explained by the variables selected in the functions of small, medium, large and pooled farms respectively. These values of R^2 were found to be significant on all the farm situations.

In Khammam district the partial regression coefficients in Cobb-Douglas production function were the same as the elasticity coefficients. The regression coefficients of most of the variables on different sizes of farm were not statistically significant. The production elasticities of land 0.31 bullock labour and seed 0.76 and 0.74 on medium farms and human labour and seed is 0.37 and 0.30 on small farms were found to be statistically significant at one percent level of probability. This implies, that a one percent increase in that particular input, keeping all the other inputs constant[5].

In Warangal district the partial regression coefficients in Cobb-Douglas production function were the same as the elasticity coefficients. The regression coefficients of most of the variables on different sizes of farm were not statistically significant. The production elasticities of bullock labour and seed 0.58 and 0.55 on pooled farms, and seed was 0.52 on small farms were found to be statistically significant at one percent level of probability. This implies, that a one percent increase in that particular input, keeping all the other inputs constant.

Returns to Scale

Further, it was observed from the table that in Khammam district the sum of elasticity coefficients for small, marginal, large and pooled farms was 0.7791, 1.4448, 0.0921and 0.5313 respectively. In Warangal district; that the sum of elasticity coefficients for small, marginal, large and pooled farms of was 0.6976, 1.4543, 0.9018 and 1.0392 respectively indicating that increasing returns on medium and large farms were prevailing in maize production on tribal farms in the study region[4,7&8].

Table 1: Production elasticities and related particulars of different inputs factors in maize on different size of Khammam and Warangal district farms

Particulars	Khammam				Warangal			
	Small	Medium	Large	Pooled	Small	Medium	Large	Pooled
Number of samples	18	18	18	54	18	18	18	54
Constant (a)	2.0849	-0.0785	6.4618	3.0622	1.6316	-0.0729	2.8101	1.2220
Land (x_1)	0.3184*	0.2569	1.4068	0.4124	-0.0393	-0.0057	0.6315**	0.1092
Human Labour (x_2)	0.3779**	0.0870	-0.5492	0.0249	0.4041**	0.3621	0.2078	0.5806*
Bullock Labour (x_3)	0.0097	0.7620*	-0.5372	-0.3576	-0.2876	0.8091	0.0617	-0.1603
Seed (x_4)	0.3058**	0.7402*	-0.3359	0.4119	0.5201*	0.3200	0.2237	0.5500*
Manures and fertilizers (x_5)	-0.1191	0.0609	-0.0327	0.0489	0.1003	-0.0312	-0.2229	-0.0403
Plant protection chemical (x_6)	-0.1136	0.0516	0.0439	-0.0092	0.0001	0.0001	0.0001	0.0001
Sum of elasticities (Σbi)	0.7791	1.4448	0.0921	0.5313	0.6976	1.4543	0.9018	1.0392
Co-efficient of multiple determination (R^2)	0.9294	0.8948	0.9670	0.9369	0.9578	0.7537	0.9563	0.9289

Note: Figures in parentheses indicates error; * Significant at 1% level; ** Significant at 5% level; @ Significant at 10% level.

CONCLUSION

The results of functional analysis revealed the production elasticity of maize in Khammam and Warangal district among different sizes of tribal farms. It was observed from the values of co-efficients of multiple determination that 0.92, 0.89, 0.96 and 0.93 and 0.95,0.75 ,0.95 and 0.92 percent of variation in output was explained by the variables selected in the functions of small, medium, large and pooled farms respectively. These values of R^2 were found to be significant on all the farm situations. In Khammam district the sum of elasticity coefficients for small, marginal, large and pooled farms of was 0.7791, 1.4448, 0.0921and 0.5313 respectively. In Warangal district that the sum of elasticity coefficients for small, marginal, large and pooled farms of was 0.6976, 1.4543, 0.9018 and 1.0392 respectively indicating that increasing returns on medium and large farms were prevailing in maize production on tribal farms in the study region**.**

The result of functional analysis revealed the production elasticity of maize in Warangal district among different sizes of tribal farms. It was observed from the values of co-efficients of multiple determinations that 0.92, 0.91, 0.98and 0.95 percent of variation in output was explained by the variables selected in the functions of small, medium, large and pooled farms respectively. These values of R^2 were found to be significant on all the farm situations.

REFERENCES

1. Bhubaneswar Sabar, Tribal Agriculture: *The Chuktia Bhunjias in Central India Economic and Political Weekly.* **45 (12):** (2010).
2. Cynthia Lai; Catherine Chan; Jacqueline Halbrendt; Linsey Shariq; Pravat Roul; Travis Idol; Chittanrajan Ray; Carl Evensen Comparative Economic and Gender, Labor Analysis of Conservation Agriculture Practices in Trib al Villages in India *International Food and Agribusiness Management Review*, **15(1):** (2012).
3. Nikulsinh M. Chauhan, Role Performance of Tribal Farmwomen in Domestic and Agricultural Activities in Gujarat State. *Journal of Progressive Agriculture,* **3:** (2011).
4. Narayanasamy P, Traditional Knowledge of Tribals in Crop Protection Indian *Journal of Traditional Knowledge*, **5(1):** 64-70 (2006).
5. Panda R. K., Arora C. P., Gore K. P., Jakhar P. and Dash B. K., Managing Terraced Lowland and Medium Sloping Land for Sustainable Agriculture: A Study from the Eastern Ghat Region of India Irrigation and Drainage, **60(5):** 694–702 (2011).
6. Solomon Retna Dhas Nadar Jeeva, Roytre Christopher Laloo; Bhanu Prakash Mishra Traditional Agricultural Practices in Meghalaya, North-East India *Indian Journal of Traditional Knowledge* **51:** 7-18 (2006).
7. Subah Singh Yadav; Satyaveer Singh, Agricultural Marketing in Tribal Areas: Some policy Issues Financing Agriculture, **44(2):** 16 (2012).
8. Govinda samy, Agora moorthy; Minna J. Hsu; Pochuen Shieh 2012 India's Women-Led Vegetable Cultivation Improves Economic and Environmental Sustainability Scottish *Geographical Journal* **128(2):** 87-99 (2012).