

## **Natural and socio-economical resources vis-?-vis crop productivity - an adaptable linkage for sustainable development in Indian sub-continent**

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### **Abstract**

Inter-play of technologies, institutions and policies form the backbone for agricultural development. Obviously, this influences the pattern and use of natural resources with varying degrees of impacts over space and time including the socio-economic linkages among them. To strengthen such factors, zonewise case studies were undertaken in the new alluvial zone in West Bengal, India. The precise objectives were to find out the interrelationship between socio-economic variables and the relationship between crop yield index and different socio-economic variables. The zonewise analyzed results are I. Analysis of the intercorrelation among different dependent and independent variables, II. Finding out the relationship between different selected socio-economic variables with crop yield index and III. Analysis of the intercorrelation among different dependent and independent variables.

Results of the study were able to highlight the acute food crisis, need for modernizing agricultural technology, increase the productivity level and bringing about social change as well. In the co-efficient of correlation study, crop yield index was significantly related to land holdings and farm power, while, education was found not to be significantly related with crop yield index. Thus the country has adopted modern agricultural production system to mitigate the ever-long crisis of food grains, notably, presently all food grains increased significantly [to 31, 311 and 221% in respect to area (million ha), production (million t) and yield (kg/ha), respectively]; irrigated area (2226% over 22.5 million ha); fertilizer consumption (6,131% over 0.29 t/ha) and per capita availability of food grains (19.02% over 394.90 g/day), respectively over the last 50 years.

### **Media summary**

The adoption process or modernization is influenced by socio-psychological and socio-personnel variables and adoption of modern agricultural techniques will definitely increase the productivity.

### **Keywords**

Agro-techniques, crop yield index, production system, socio-economic

### **Introduction**

In order to solve the acute food crisis, which India had been facing since independence, one of the most important ways is to facilitate a technological breakthrough in the field of agriculture. As a result, attention had been paid towards finding out newer types of agricultural innovation, which may contribute significantly to boosting agricultural production systems to a saturated level. But the success of achieving a real goal is solely depends upon the adaptation outcome by the farmers as most of them residing in remote village level. So for facilitating the technological revolution in the field of agriculture, ways of communicating to the prospective clientele should be given its due importance as success of any innovations depends largely on how the individuals of particular social system (adoption, modernization, acculturation etc.) will react on it (Rogers and Shoemaker 1971). It may be stated that increased adoptions of modern agricultural techniques will lead to increased productivity in the field of agriculture. In this sense the adoption of innovations may be treated as a means to an end, not an end itself. In other words the success of the adoption of modern techniques of agricultural production will be reflected through increased productivity. Keeping the above mentioned points are in mind, the present study had

been conducted under New Alluvial Zone of West Bengal, India with the objectives as I. To analyse the interrelations amongst different dependent and independent variables, II. Finding out the relationship between different selected social and economic variables with the crop yield index.

## **Methodology**

The pilot study was undertaken in the New Alluvial Zone of West Bengal under the Republic of India situated between 21°31' and 27°14' North latitude and 85° 51' and 89°53' East Longitude and the tropic of cancer running across the middle of this state. A composite structured schedule was formulated for collecting information regarding the background characteristics of the respondents and standardization of their socio-economic status was made by the scale (0, 1, 2, 3, 4, 5, 6), developed by Pareek and Trivedi (1965) (1964 in references??). Test-retest reliability of the scale was 0.87. The other measurement on dependent and independent variables such as extension contact, cosmopolitanism (Rogers and Shoemaker 1971) of the respondent, management orientation (Samanta 1977) and crop yield index of the region had been taken also.

## **Results**

### *Relationship between socio-economic status and other dependent and independent variables*

The results indicated that socio-economic status of the respondents under the present investigation was found to be significantly related with the different dependent and independent variables (Table 1). Rogers and Shoemaker (1971) argued the logic behind these types of findings was the fact that more effective communication with client occurred when the sources and receiver were homophiles. They further emphasized that almost every such analysis in this field showed that change agent had more communication with higher status than with lower status members of a society. As a consequence of higher social and economic status the farmers under the present investigation had moved outside their community to seek information regarding farming. Actually the farmers with higher socio-economic status had to become more cosmopolitan in nature in order to establish higher extension contact. Significant relationships between utilization of communication sources and socio-economic status were awarded due to utilization of more mass media by the respondents than the individuals who were utilizing personnel local sources information. The significant relationship between management orientation and socio-economic status might be explained in terms that in order to become oriented towards planning, production and marketing, some of the socio-economic status of an individual contributed significantly. This might be education, land holding, materials possession and farm power, though the contribution of them had not been tested at the empirical level. The socio-economic status and crop yield index of the respondents was found to be significantly related in the present investigation. It may be presumed that the productivity is influenced by the extent of adoption of scientific agricultural practices. The crop yield index, which had been chosen as the dependent variable might be thought of as the ultimate effect of adoption of scientific techniques. Adoption behavior of the farmers had been found to be associated with education, economic status, holding size and also with the socio-economic status of an individual as a whole (Bose 1961). Therefore it might be argued that higher status farmers were observed in the present study to have higher crop yield index due to their sophisticated adoption behavior.

### *Relationship between extension contact and other dependent and independent variables*

Extension contact had been evident to be significantly related with all the variables. Higher degree of contact with the extension personnel resulted into greater motivation on the part of such farmers, which led them towards greater planning regarding the mode of production, adoption of scientific agricultural practices and marketing of the produce. As a result of these, the respondents with higher extension contact exhibited higher degree cosmopolitanism, utilization of communication sources, management orientation and crop yield index.

### *Relationship between cosmopolitanism and other dependent and independent variables*

Cosmopolitanism in the present study had been found to be significantly related with utilization of communication sources and management sources. The reason behind that the movement of an individual outside his social and encouraged the motivational components behind the variable management orientation. The study however failed to find any significant relationship between the cosmopolitanism and crop yield index. This was due to the fact that crop yield index was more affected by the economic factors than the social factors.

**Table 1. Distribution of the results of the intercorrelation between different variables**

Variables	Socio-economic status	Extension contact	Cosmopolitaness	Utilization of communication sources	Management orientation	Crop yield index
Socio-economic status		0.486**	0.541**	0.531**	0.567**	0.240**
Extension contact			0.510**	0.507**	0.412**	0.241**
Cosmopolitaness				0.617**	0.495**	0.154**
Utilization of communication sources					0.689**	0.272**
Management orientation						0.371**
Crops yield index						

\*\* Significant at 1% level of significance

*Relationship of utilization of communication sources and other dependent and independent variables*

Significant relationships were obtained between the utilization of communication sources and the management orientation and crop yield index. Management orientation involves attitudinal predisposition of an individual towards planning, production and marketing. This involve gathering of knowledge regarding the techniques of this aspects, as knowledge function had been thought of by Rogers and Shoemaker (1971) to be the prerequisite of the persuasion function in the innovation-decision procession. On the other hand it had been earlier stated that the crop yield index was the resultant of adoption behavior and hence it might be argued that due to the increased adoption of agricultural practices by the utilization of mass media and cosmopolite channels of communication, the respondents' productivity were increased.

*Relationship between management orientation and crop yield index*

A dearth result indicated the significant relation between management orientation and crop yield index was observed in this field study. It might be expected that that more prone a farmer became towards managing his farm efficiency, the more would he consider the scientific agricultural technology and more

productivity would result. Hence, the management orientation was found to be significantly associated with the crop yield index.

**Table 2. Correlation of different selected social and economic variables with Crop Yield Index**

Variables	Farm power	Land holding	Education
Crop yield index	0.295**	0.221**	0.058

\*\* Significant at 1% level of significance

*Relationship of crop yield index and selected social and economic variables*

The results indicated significant relationship between crop yield index on one hand and farm power and land holding on the other (Table 2). Such findings indicated that the productivity of the respondents was influenced by the economic factors. Several research workers found that the earlier adopters had large sized units (farms and so on) than the late adopters (Bakshi 1962). In view of these findings, it might once again be stated that the contribution of the economic variables on the extent of adoption of scientific agricultural practices, which had been, thought of as the essential prerequisite to increase the productivity. The study however did not find any significant relationship between crop yield index and education, a social variable.

*Production and input utilization trend*

Notably, at present all the food grains increased significantly increased to 31.35, 311.0 and 221.3% in respect to area, production and yield respectively; irrigated area from 22.6% over 22.56 million hectare; fertilizer consumption from 6,131.0% over 0.29 t ha<sup>-1</sup> and per capita availability of food grains from 19.02% over 394.90g day<sup>-1</sup>, respectively over the last 50 years (Table 3). This was due increased adoption of modern agricultural technologies and better communicability of the farmers.

**Table 3. Trend in development in Agriculture**

		1950-51	1960-61	1970-71	1980-81	1990-91	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Food grains	A	97.30	115.60	124.30	126.70	127.80	121.02	123.58	123.88	125.17	123.06	119.01
	P	50.82	82.02	108.42	129.59	176.39	180.42	199.44	192.26	203.61	208.87	196.07
	Y	522	710	872	1023	1380	1491	1614	1552	1627	1677	1638
Irrigated area		22.56	27.98	38.19	49.78	62.47	71.35	73.25	72.78	--	--	--
Fertilizer consumption		0.07	0.29	2.17	5.52	12.55	13.88	14.31	16.19	16.80	18.07	--

n (t)

Per capita availability of food grains (g day <sup>-1</sup> )	394.9 0	449.6 0	455.0 1	410.4 0	472.6 0	495.3 0	476.2 0	505.5 0	450.3 0	470.4 0	458.6 0
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A= Area, Million ha; P= Production, t; Y= Yield, kg ha<sup>-1</sup>

## Conclusion

In concluding the present investigation it might be said that the crop yield index was found to be influenced by different intervening variables. So it might be emphasized that the productivity of a farmer was found as a consequent of his adoption behavior. In arriving at this conclusion, however, it had been found that the productivity was more influenced by the economic variables, rather than the social variables. Even when the social variables influenced the adoption behavior, as had been reported by various researchers, might be thought of as a consequence of favourable economic condition. The conditions prevailing at present in the developing countries like India, permits those individuals with higher economic status in the social milieu, to grab the lionshare of technological development. This had been possible due to the acute social and economic disparity evidenced in the countryside. So the process of facilitating agricultural modernization and bringing about National Development, attempts should be made the economic inequality and consequently this will have a bearing on the social situation.

## References

Rogers, E. M. and Shoemaker, F. F. (1971) *Communication of Innovation A Cross Cultural Approach*. Free Press. New York.

Pareek, U and Trevedi, G. (1964??5) Reliability and Validity of Rural Socio-economic Status Scale, *Indian J. of Applied Psychology*, 1: 34-40.

Samanta, R. K. (1977) *A study of some Agro-Economic, Socio-Psychological and communication variables associated with repayment of Agricultural loans from nationalised bank*. Ph. D Thesis. Deptt. of Agril. Extension, Bidhan Chandra Krishi Viswavidyalaya.

Bose, S. P. (1961) Characteristics of farmers who adopt agricultural practices in Indian village, *Rural Sociology*. 26: 21-31.

Bakshi, B. (1962) *Differential Acceptance of Alkathane Storage Bin as Related to Levels of Exposure and Socio-Economic Characteristics of the Farmers in Kanjhawala Block*. M. Sc. Thesis. New Delhi. Indian Agricultural Research Institute.