Socialization Level and Market Response of Pulse Crop: Structural and Functional Interpretation

Dibyendu Pal[1*], Arindam Ghosh[1], Amitava Biswas[1], Sankar Kr. Acharya[1] and Kabita Mondal[2]

[1]*Department of Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, Pin - 741252, India.*
[2]*Department of Agricultural Extension, Uttar Banga Krishi Viswavidyalaya, Dakshin Dinajpur, West Bengal, Pin - 733133, India.*

Authors' contributions

This work was carried out in collaboration among all authors. Author DP wrote the first draft of the manuscript, collected data and done statistical analysis. Authors AG and KM helped in collection of data and preparation of manuscript. Authors AB and SKA helped in interpretation and supervised the work. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Pulses are important component of diet in Indian, mainly for being one of the leading cheap and reliable sources of protein. The emphasis of the Government has, accordingly, been on increasing production of pulses through area expansion and adoption of improved technology. Equally important is the marketing of the pulses, particularly in an objective condition created by the introduction of reforms in the marketing sector, conspicuous by an existing demand-supply gap in pulses. Marketing can also help inducing an element of incentive to farmer through participation in processing and distribution of pulses through direct marketing, or cooperative marketing to get higher share in the consumer's price. The study has been carried out in two developed block namely Chakdah and Haringhata of Nadia district in West Bengal. The two villages out of twenty-seven gram panchayat were purposively selected for the present study. The multistage purposive and random sample techniques were the key to contrast sampling design in the present study. The

_____

Corresponding author: E-mail: paldibyendu02@gmail.com;

statistical tools like mean, standard deviation and coefficient of variation, coefficient of variation, coefficient of correlation, multiple regression, step down multiple regression and path analysis. The study also responded to the inquiry as to where and how much the crop marketed this will be much rewarding and beneficiary to the common farmer. The determinants like yield (kg/bigha), farmer's attitude towards Pulse crop cultivation and gross return (Rs/ Bigha) are decisively characterizing the marketed surplus of pulse crop.

1. INTRODUCTION

Pulse provides the green source of protein to millions of Indian and beyond. In India pulse crop have been described as a "poor man's meat and rich man's vegetable". It's a rare type of vegetative protein which retain lysine one of the most important amino acid. As against animal protein, it's the cheaper source of vegetative protein as well. As a crop, it needs less water and nutrient, less cost of investment as well. Indian agriculture cannot fulfill the total pulse requirement, hence, a huge expenditure incurred over pulse import and export [1].

The emphasis of the Government has, accordingly, been on increasing production of pulses through area expansion and adoption of improved technology so as to ensure the availability of pulses to the masses as per quantity recommended by ICMR [2]. Equally important is the marketing of the pulses particularly in a situation created by the introduction of reforms in the sector and existing demand-supply gap in pulses. In India, major pulses like chickpea, lentil and pigeonpea account for 39, 10 and 21% of the total pulse production in the country [3], this leads to a Shortage of supply of pulses has resulted in increase in prices, thereby pushing pulses out of the reach of poor household leading to a negative effect on their nutritional status [4].

The Indian food economy, since 1970, has also undergone major policy reforms, including trade liberalization leading to opening up of domestic pulse market to international trade. The market is very lucrative and of major significance to the world pulse economy [5] as has been evident by the increased imports of pulses in India in recent past. The marketing component is important to ensure remunerative prices to the farmers which will eventually work as an incentive for them to bring more area under pulses [6]. The Government has provided price support to the framers through minimum support price of leading pulses [7]. However, the marketing and price policy of the government should be the focus of various government initiatives mainly the extension programmers', so that the awareness may be created among farming community and farmers may respond more effectively to the various production incentives given by the Government [8]. Marketing can also help in inducing an element of incentive to farmer through participation in processing and distribution of pulses through direct marketing, farmers market or cooperative marketing to get higher share in the consumer's price [9]. Marketing innovations like group marketing will help in improving the bargaining powers of small and marginal farmers [10]. The following specific objectives are set to intervene the present study. Those are, to generate basic information on socialization of pulse crop in the study area to identify and standardize the variables, dependent and independent, impacting on both socialization and market response of pulse crop in the study area, to elucidate inter and intra level interaction between dependent variables i.e. Socialization with those of selected socio economic and ecological variables, to delineate the micro level policy based on the empirical result on effective socialization process and market response.

2. MATERIALS AND METHODS

The study has been carried out in two developed block namely Chakdah and Haringhata of Nadia District in West Bengal using purposive sampling scheme. The next phase of study was to select the respondents. Farmers who were cultivating pulse in their own field or having tenancy status were selected as respondents. A list of such respondents from each village was collected from the village head and the village Gram Panchayat office. 150 farmers were finally selected randomly from the list that was collected from the village head and the village Gram Panchayat office. Here 75 farmers were selected randomly from each village selected. The respondents were interviewed through personal interview methods with the help of structured schedule which was developed for the study.

Before taking up actual fieldwork a pilot study was conducted to understand the area, its people, institution, communication and extension system and the knowledge, perception and attitude of the people towards climate change concept. An outline of the socio-economic background of the farmers of the concerned villages, their opinion towards different types of technology socialization process, innovation-decision process, discontinuance, disagreement, conflict, rejection, dissonance, reinvention and confusion helped in the construction of reformative working tools. The variable Marketed surplus was considered as the dependent or predicted or consequent variable have been measured in term of extent of adoption, extent of rejection, extent of discontinuance using the scale developed by S. N. Chattopadhyay (1993) which was slightly modified for the requirement of the study. The twenty-seven independent or casual or predictor or antecedent variables selected and operationalized and measured according to their concept and relationship with the dependent variables with the help of exact scales developed by the previous social scientist or by slightly modifying the developed scales for the requirement of the study. The final primary data were collected with the help of structured interview schedule by following the personal interview method. The secondary data were collected by following case study method to throw the light into the intrinsic character of the

consequences of the innovation decision process and to establish the conceptual framework of the present study on strong logistic. The statistical tools like mean, standard deviation and coefficient of variation, coefficient of variation, coefficient of correlation, multiple regression, step down multiple regression and path analysis.

3. RESULTS AND DISCUSSION

Fig. 1 presents the correlation coefficient of consequent variable, marketed surplus (Y_1) with 27 independent variables. It has been found that variables viz income (Rs /per capita/annum) (X_8), market Orientation (X_{13}), productivity or yield (kg/Bigha) (X_{24}) have recorded the positive correlation and attitude towards adoption (X_{21}).has recorded significant but negative correlation with marketed surplus (Y_4).The result shows that income (Rs /per capita/annum) regress when farmers are producing ample of marketed surplus. This would suggest that, farmers need to build up better empirical skill for generating both income and marketed surplus together. It also inventing that better market orientation, has contributed to generation of higher marketed surplus but attitude towards adoption has recorded but significant correlation. This would suggest that attitude toward adoption is not that relevant in generating marketed surplus. Quite logical, productivity or yield has recorded a positive impact on marketed surplus.
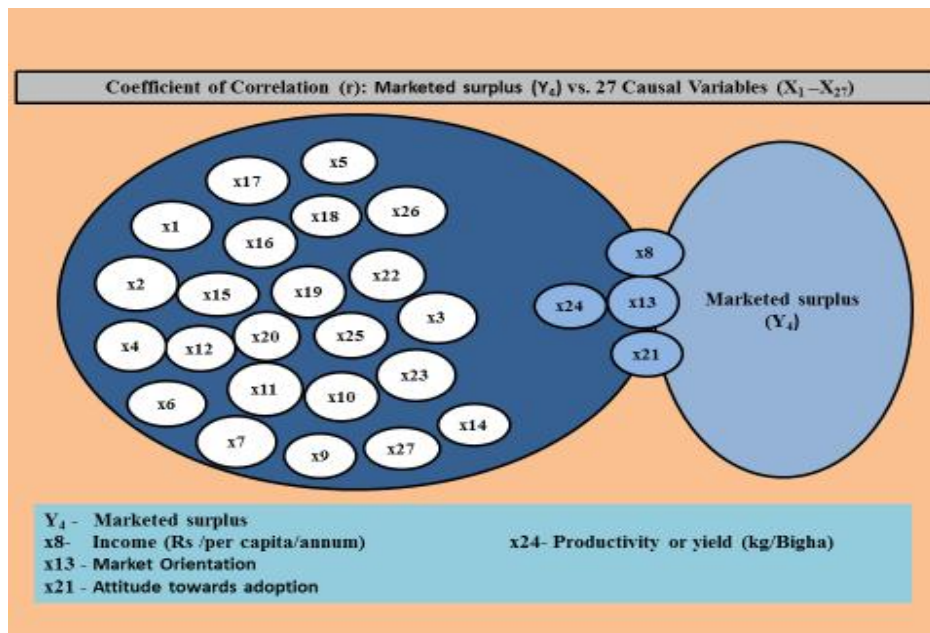

Fig. 1. Model of correlation coefficient of marketed surplus (Y_1) with 27 independent variables

Table 1 Presents the multiple regression analysis which reflects the functional efficacy of the correlation through 'beta' value and respective't' values of the casual variables on the consequent variables i.e. Marketed surplus (Y_1).

Table 2 presents the R^2 value 0.778 being, it's is to conclude that even combination of all 27 variables so far,77.8% of variability embedded with the consequent variable has been explained.

Table 1. Coefficients of multiple regression analysis of marketed surplus (Y_1) with 27 causal variables

Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1. Age (X_1)	-0.306	0.285	-0.066	-1.071	0.286
2. Education (X_2)	0.363	1.208	0.019	0.301	0.764
3. Family size (X_3)	-0.051	0.714	-0.005	-0.071	0.943
4. Family education (X_4)	-0.379	1.426	-0.017	-0.266	0.791
5. Area under pulse cultivation (Bigha) (X_5)	-6.433	9.051	-0.108	-0.711	0.479
6. Farm size and technology adoption (Bigha) (X_6)	-1.140	0.766	-0.129	-1.489	0.139
7. No of crop diversity (X_7)	-3.780	7.804	-0.041	-0.484	0.629
8. Income (Rs /per capita/annum) (X_8)	6.910-005	0.000	0.032	0.510	0.611
9. Risk Orientation (X_9)	-1.930	2.352	-0.051	-0.821	0.413
10. Scientific Orientation (X_{10})	-3.665	2.406	-0.099	-1.523	0.130
11. Planning orientation (X_{11})	-0.272	2.389	-0.007	-0.114	0.910
12. Production orientation (X_{12})	0.473	2.261	0.013	0.209	0.835
13. Market Orientation (X_{13})	5.513	2.968	0.118	1.858	0.066
14. Farmers attitude towards Pulse crop cultivation (X_{14})	-7.420	3.270	-0.160	-2.269	0.025
15. Knowledge level of farmer towards cultivation of pulse crop (X_{15})	2.303	1.438	0.114	1.602	0.112
16. Knowledge about insecticides (X_{16})	7.857	13.028	0.037	0.603	0.548
17. Knowledge about fungicide (X_{17})	5.068	13.401	0.024	0.378	0.706
18. Knowledge about weed control (X_{18})	16.184	8.349	0.127	1.938	0.055
19. Knowledge about IPM practice (X_{19})	-21.575	19.687	-0.066	-1.096	0.275
20. Farmers attitude towards IPM programme (X_{20})	-5.158	3.672	-0.087	-1.405	0.163
21. Attitude towards adoption (X_{21})	-5.760	3.267	-0.111	-1.763	0.080
22. Attitude towards discontinuous (X_{22})	-1.909	2.811	-0.043	-0.679	0.498
23. Attitude towards rejection (X_{23})	-9.273	5.264	-0.109	-1.762	0.081
24. Productivity or yield (kg/Bigha) (X_{24})	0.676	0.061	0.730	11.168	0.000
25. Gross return (Rs/ Bigha) (X_{25})	0.001	0.001	0.146	0.993	0.323
26. Utilization of cosmopolite sources of information(X_{26})	6.309	12.568	0.031	0.502	0.617
27. Training received (X_{27})	0.138	0.985	0.009	0.140	0.889

Table 2. Multiple regression analysis of socialization of pulse enterprise (Y_1) with 27 causal variables (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.778[a]	0.605	0.517	30.835196	0.605	6.916	27	122	0.000

Table 3. Path analysis of comprehensive marketed surplus (Y_1) with 27 causal variables

Variables	Total effect	Direct effect	Indirect effect	Substantial effect		
				I	II	III
1. Age (X_1)	0.0100	-0.0657	0.0757	0.0562 X24	0.0182 X14	0.0103 X15
2. Education (X_2)	0.0520	0.0201	0.0319	0.0358 X24	0.0186 X13	-0.0132 X15
3. Family size (X_3)	-0.0540	-0.0047	-0.0493	-0.0416 X24	-0.0391 X5	0.0391 X25
4. Family education (X4)	0.0240	-0.0172	0.0412	0.0209 X13	-0.0142 X15	0.0121 X21
5. Area under pulse cultivation (Bigha) (X_5)	-0.0920	-0.1087	0.0167	0.1318 X25	-0.0774 X14	-0.0760 X24
6. Farm size and technology adoption (Bigha) (X_6)	-0.0520	-0.1288	0.0768	0.0475 X24	0.0285 X7	0.0104 X13
7. Number of crop diversity (X_7)	0.0260	-0.0415	0.0675	0.0886 X6	-0.0148 X15	0.0131 X24
8. Income (Rs /per capita/annum) (X_8)	0.2150	0.0326	0.1824 (III)	0.1928 X24	0.0056 X18	0.0055 X1
9. Risk Orientation (X_9)	-0.0040	-0.0521	0.0481	0.0308 X18	0.0307 X24	-0.0170 X15
10. Scientific Orientation (X_{10})	-0.0090	-0.0990	0.0900	0.0256 X24	0.0255 X15	0.0146 X23
11. Planning orientation (X_{11})	0.1320	-0.0075	0.1395	0.1132 X24	0.0222 X18	0.0171 X6
12. Production orientation (X_{12})	-0.0060	0.0127	-0.0187	-0.0402 X24	0.0120 X6	-0.0111 X15
13. Market Orientation (X_{13})	0.1610	0.1179	0.0431	0.0745	0.0218	-0.0113

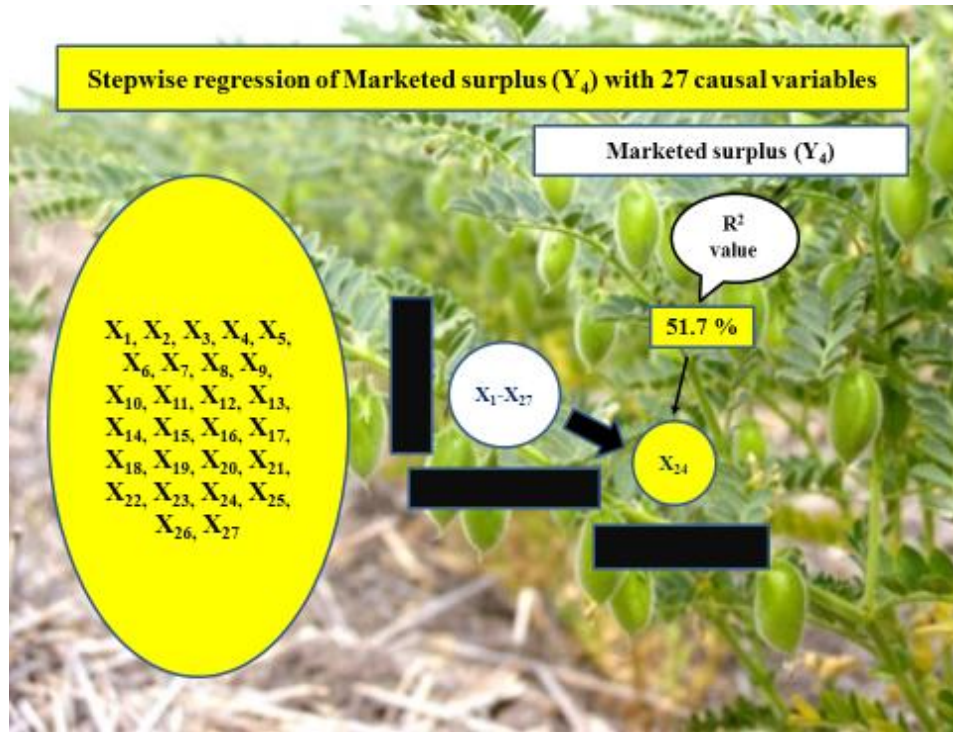| Variables	Total effect	Direct effect	Indirect effect	Substantial effect		
				I	II	III
14. Farmers attitude towards Pulse crop cultivation (X_{14})	-0.1200	-0.1597 (II)	0.0397	X24 0.0740 X25	X21 -0.0527 X5	X6 0.0287 X15
15. Knowledge level of farmer towards cultivation of pulse crop (X_{15})	-0.1060	0.1140	-0.2200 (II)	-0.1242 X24	0.0458 X25	-0.0402 X14
16. Knowledge about insecticide (X_{16})	0.0010	0.0369	-0.0359	-0.0329 X24	0.0099 X6	0.0098 X23
17. Knowledge about fungicide (X_{17})	-0.0170	0.0237	-0.0407	-0.0774 X24	0.0196 X18	0.0171 X15
18. Knowledge about weed control (X_{18})	0.1400	0.1274	0.0126	0.0716 X24	-0.0184 X20	-0.0148 X23
19. Knowledge about IPM practice (X_{19})	0.0190	-0.0656	0.0846	0.0789 X24	0.0128 X15	0.0126 X25
20. Farmers attitude towards IPM programme (X_{20})	-0.0340	-0.0876	0.0536	0.0268 X18	-0.0205 X24	0.0151 X21
21. Attitude towards adoption (X_{21})	-0.1890	-0.1110	-0.0780	-0.1037 X24	-0.0231 X13	0.0180 X15
22. Attitude towards discontinuous (X_{22})	0.0490	-0.0432	0.0922	-0.0179 X22	0.0161 X14	0.0136 X10
23. Attitude towards rejection (X_{23})	-0.0200	-0.1087	0.0887	0.0621 X24	0.0173 X18	0.0133 X10
24. Productivity or yield (kg/Bigha) (X_{24})	0.7190	0.7304 (I)	-0.0114	-0.0194 X15	0.0158 X21	-0.0143 X25
25. Gross return (Rs/ Bigha) (X_{25})	-0.0760	0.1459 (III)	-0.2219 (I)	-0.0982 X5	-0.0810 X14	-0.0716 X24
26. Utilization/Information/Cosmopolite (X_{26})	0.0540	0.0305	0.0235	0.0307 X24	-0.0255 X15	0.0169 X6
27. Training received (X_{27})	0.0250	0.0250	0.0000	0.0433 X25	-0.0327 X5	-0.0286 X14

Fig. 2. Model of stepwise regression analysis of socialization of pulse enterprise (Y_1) with 27 causal variables

Fig. 2 presents the step down multiple regression. It has been found that the variable productivity or yield (kg/Bigha) (X_{24}) have been retained after eliminating the trivial in the preceding step and also presents these variable explained 51.7 per cent of total 'r^2' values of 60.5 per cent. So 1 variable of the total 27 variables merit highest importance in marketed surplus (Y_4). The variables retained in the last stage in stepwise regression analysis does present and operational constellation of 1 dominant variable working together and interacting ridiculously it can characterize both the level and direction of disillusionment. So, these variable can go immensely important in making the farmers relinquished of disillusionment and thus have incubated an important strategic implementation for research locale and similes.

Table 3 presents the path analysis, by decomposing the total effect (r) of antecedent variables into direct indirect effect and residual effect. Path analysis has been administered to get direction and network of influence of antecedent variables on consequent variable. From the table, it's is clear that variable, productivity or yield (kg/Bigha) (X_{24}) has exerted highest direct effect on marketed surplus (Y_1)

followed by farmer's attitude towards Pulse crop cultivation (X_{14}) and gross return (Rs/ Bigha) (X_{25}). In case of indirect effect on marketed surplus (Y_1) gross return (Rs/ Bigha) (X_{25}) has exerted the highest indirect effect on marketed surplus (Y_1) followed by knowledge level of farmer towards cultivation of pulse crop (X_{15}) and income (Rs /per capita/annum) (X_8). It is discernible from the table the highest number of variables (22) has routed their substantial indirect effect through the variable, productivity or yield (kg/Bigha) (X_{24}). So, it could be inferred that these variables have got both substantive and associational properties to characterize the marketed surplus (Y_1).The residual effect being 0.3948, it is to conclude that 39.48 per cent of variation in this relation could not be explained.

4. CONCLUSION

In Indian agriculture, pulse crop is earning an exponential importance because of its tremendous economic and ecological importance. Thus present study evinces that socialization of pulse enterprise has been a complex interplay and analogue between the sets of predictor and predicted characters.

The socialization of pulse enterprise, marketed surplus, marketable surplus, and socialization of reinvention and replacement intervention are being characterized by 27 predictor variables which are mainly socio economic and agro ecological by nature.

The study also responded to the inquiry as to where and how the classical crop production process can be replaced with pulse crop and whereas this replacement will be much rewarding and beneficiary to the common farmer.

The determinants like productivity or yield (kg/Bigha) (X_{24}), gross return (Rs/ Bigha) (X_{25}), knowledge level of farmer towards cultivation of pulse crop (X_{15}) and income (Rs /per capita/annum) (X_8) are decisively characterizing the socialization process of pulse crop.

If pulse crop remains as an option only for marginal farmer. It can't own grow, it must be an enterprise with both social value and ecological property.

To delineate micro level policy structure, the empirical model of path analysis, can help by depicting the fact that the marketed surplus in pulse crop should be focused conjointly. At the same time effective training intervention on adoption of pulse crop, through replacement and reinvention can offer a boost to this golden crop.

Without pulse in humanity, can survive and it can dovetail both the destiny of soil and society by providing nitrogen to soil and protein to human body.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Burman RR, Singh SK, Singh L, Singh AK. Extension strategies for increasing pulses production for evergreen revolution. Indian Research Journal of Extension Education. 2008;8(1):5-8.
2. Dolli SS, Swamy BS. Impact of adoption of recommended practices on yield of pulse crops. Karnataka Journal of Agricultural Sciences. 1997;10(1):177-182.
3. Anonymous. Annual Report of National Food Security Mission-Pulse Component, Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India, New Delhi; 2009.
4. Pothuluru C, Yadagiri P. Farm output and marketing behaviour of rural poor: Some observations. Agricultural Marketing. 1992; 34(4):26-29.
5. Sidhu RS, Sidhu MS, Singh JM. Marketing efficiency of green peas under different supply chains in Punjab. Agricultural Economics Research Review. 2011;4(2): 267-273
6. Borate A, Zala YC, Darji VB. Analysis of marketable and marketed surplus of red gram in Vadodara district of Gujarat. Legume Research. 2011;34(4):267-272.
7. Chand R. Agricultural development, price policy and marketed surplus in India - study of green revolution region. Agricultural Development, Price Policy and Marketed Surplus in India Study of Green Revolution Region. 1991;128.
8. Pawar ND. Marketed surplus and price spread of green gram: A case study in Parbhani district of Marathwada region of Maharashtra. Agricultural Marketing. 1997; 40(3):28-30.
9. Ahmed MM, Preckel PV, Baker TG, Lopez-Pereira M. Modeling the impact of technological change on nutrition and marketed surplus. Agricultural Economics. 2001;25(1):103-118.
10. Bajpai BK. Regional variations in food grains, marketable and marketed surplus in Uttar Pradesh. Bihar Journal of Agricultural Marketing. 1994;2(2):153-163.