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Original Article

The Estimation of Income, Livelihood and Productivity from Pulse Enterprise: The Analysis and Implication

Sankar Kumar Acharya[1], Amitava Biswas[2], Subham Mandal[3], Riti Chatterjee[4], Anwesha Mandal[5]

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Author's Affiliation
[1,2]Professor, [3]PG Scholar, [4,5]Senior Research Fellow, Department of Agricultural Extension, Faculty of Agriculture, Bidhan Chandra Krishi Viswavidyalaya, P.O. Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal 741252, India.

Coressponding Author:
Sankar Kumar Acharya, Professor, Department of Agricultural Extension, Faculty of Agriculture, Bidhan Chandra Krishi Viswavidyalaya, P.O. Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal 741252, India.

E-mail: ritichatterjee2015@gmail.com

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Abstract

As a leguminous crop, pulse is the prime mover for ecological health of farm lands which are running under extensive cultivation. It is also one of the most preferred crops in the rain fed agro-ecosystem of Purulia. Specially in a rice-fallow agriculture, pulse is the main source of protein to millions and a dependable mentor of soil health. The present study has been conducted in Manbazar-1 and Purulia-1 blocks of Purulia district and data were collected from 75 respondents who are mainly small and marginal farmers. The selection of the respondents has followed the random sampling method by using an exhaustive list of pulse growers from selected locale. Higher marketable surplus and higher size of homestead land have got the most importance. The study has offered a unique micro level policy implication at a time when the entire Nation is trying to boost up pulse productivity and cultivation throughout the length and breadth of geography of India.

Keywords: Ecology of pulse; Marketable surplus; Marketed surplus; Productivity; Regression analysis and yield.

Introduction

Pulse crop is the most important source of natural protein to millions of people across the world. The role of the pulse is not only confined to our dietary composition, but it also contributes to soil health, moister retention, livelihood generation, and unlashing important ecological function as well as. Pulse provides the green source of protein to millions of Indian and beyond. In India pulse have been describing as a "poor man's meat and rich man's vegetable". It's a rare type of vegetative protein which retains lysine one of the most important amino acid. As against animal protein, it is the cheaper source of protein as well. Pulse crops require less water and nutrient, less cost of investment as well. As Indian agriculture cannot fulfill the total pulse requirement due to some difficulties faced by the farmer's, a huge expenditure incurred over pulse import and export.

Pulse is an eco-friendly crop. Pulses are also an excellent feed and fodder for livestock. Pulse crop with its unique ability of biological nitrogen fixation, carbon sequestration, soil amelioration, low water requirement and capacity to with stand changing the climate, pulse have remained an integral component of sustainable crop production system since time immemorial, especially in the dry areas. It adds nitrogen to the soil, retain soil moisture and leave added nutrient for the next crop.

The present study's main perception is income, livelihood and productivity benefits of pulse crops.

Global warming is a harsh reality and returns from conventional crops rice-wheat are dwindling very fast, the importance of pulse crop, both economic and ecological terms is generating both promises and critical acceptance as well.

Food and Agriculture Organization of the United Nations (FAO), the United Nations General Assembly (UNGA) declared 2016 as the International Year of Pulses (IYP).

The study area is basically representing rice based crop ecology, where the pulse is being promoted to replace summer rice. The replacement process is earning critical visions including resource exploitation, marketability, ecological compatibility, social acceptance, and livelihood dynamics. A perception process is generally built up based on one binary aspect- a) Past experience.

The quality perception, better or worse, depends on experience and that is how perception is empirical as well as abstract.

The present study of pulse enterprise, in terms of its selected and predicted characters (Y_1-Y_{12}), thus invites a perception of experience on pulse cultivation with the following objectives:

1. To organize a study on socio economic and ecological variables in order to estimate income, livelihood and productivity of pulse enterprises.
2. To estimate the nature, level, and direction of interactive relationships among and between the set of economic and ecological variables as selected for the study.
3. To generate a micro level policy for the improvement in the aspect like income, livelihood, and productivity for equitable and sustainable development.

Methodology of Research

The locale of Research

Dhanara & Manara GP of the Manbazar-1 & Purulia-1 block of Purulia district in West Bengal was purposively selected for the study. The village namely was Dhanara & Sidpur selected by random sampling. The area has been selected for the study because of – (a) there is sample scope for collecting relevant data for the present study, (b) acquaintance with the local people as well as local language, (c) the concerned area was very easily accessible to the researcher in terms of place of residence, (d) the area was very easily accessible to the researcher in terms of transportation and (e) the closer familiarities of the student researchers with the area, people, officials and local dialects.

Pilot Study

Before taking up actual field work 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.

Sampling Design

Purposive as well as simple random sampling techniques were adopted for the study.

Table 1: Sampling Techniques and Sampling Design

Step	Items	Level	Approach
1	State	West Bengal	Purposive
2	District	Purulia	Purposive
3	Subdivision	Purulia sadar	Purposive
4	Block	Manbazar-1 & Purulia-1	Purposive
5	Gram Panchayat	Dhanara & Manara	Purposive
6	Village	Dhanara & Sidpur	Random
7	Respondents	75	Random

Empirical Measurement of the Variables

After reviewing various literatures related to the field of study and consultation with respected chairman Advisory Committee and other experts, a list of variables was prepared.

Variables in the present study have been categorized into two main categories.

(1) Independent variables. (2) Dependent variables.

1. Independent Variables:

- Age (x1)

  In all societies, age is one of the most important determinants of social status and social role of the individual. In the present study, the age of the respondent was measured on the basis of their chronological age at the time of the investigation.

- Education (x2)

  Education is instrumental is building personality structure and helps in changingone's behavior in social life. Education may be conceptualized as the amount of formal schooling literacy acquired by the responded.

- Exposure Unit (x3)

  Participation in meeting

- Family Size (x4)

  A number of family members of individual farmers.

- Family labour (x5)

  Family farming is a means of organizing agricultural, forestry, fisheries, pastoral and aquaculture production which is managed and operated by a family and predominantly reliant on family labour, including both women's and men's. Here the number of family members who attach with the farming was taken as family labour.

- Size of Holding (x6)

  The amount of land owned by a person is an important parameter to access the economic status of the person in society.

- No of fragments (x7)

  It's the number of fragmented lands of an individual farmer.

- Cropping Intensity (x8)

  It has been conceptualized as the proportion of total annual cropped area to the size of holding expressed in percentage. It's calculated as-

$$= \frac{\text{Gross Cropped area}}{\text{Net Sown Area}} \text{X100}$$

- Home Stead Land (x9)

  The amountof land owned by a person is an important parameter to assess theeconomic status of the person in society.

- Marketable Surplus (x10)

  The marketable surplus is a term that agriculturalists use to refer to a specific type of surplus that farmers and ranchers deal with. It was taken on the per bigha basis of the individual farmer.

- Marketed Surplus (x11)

  Marketed Surplus as compared to Marketable Surplus is a practical ex-post concept and refers tothat part of the marketable surplus which is marketed by the producer i.e., not only the part which is available for disposal but that part which is made available to the market or to the disposal of the non-farm rural and urban population. It was taken on the per bigha basis of the individual farmer.

- Distance from market (x12)

  It's the distance between the market and the field of a farmer.

- Cost of Fuel (x13)

$$= \frac{\text{Consumption of diesel/Petrol. Electricity in a year}}{\text{Size of family}}$$

- Family Expenditure (x14)

$$= \frac{\text{Family income in a year}}{\text{Family size}}$$

- Total Cost (x15)

$$= \frac{\text{Total cost of fuel + Family expenditure + Expanse in pulse cultivation}}{\text{Size of family}}$$

- Crop biodiversity (x16)

$$= \frac{\text{Total no of crops}}{\text{Size of holding}}$$

- Animal Resource (x17)

$$= \frac{\text{Total no of animal}}{\text{Family size}}$$

2. Dependent Variables

Return from pulse crop (Y_1): It is measured in term of Rs/Bigha.

Result and Discussion

Table 2: Coefficient of correlation between Return from pulse crop (Y_1) and 17 independent variables (x1-x17)

Independent Variable	r Value	Remarks
Age (x1)	-0.063	
Education (x2)	-0.044	
Exposure Unit (x3)	-0.120	
Family Members (x4)	0.278	*
Family Labour (x5)	0.218	
Size of holding (x6)	0.538	**
Number of Fragments and average size (x7)	0.480	**
Cropping Intensity (x8)	-0.221	
Home-stead Land (x9)	0.379	**
Marketable Surplus (x10)	0.749	**
Marketed Surplus (x11)	0.738	**
Distance From Market (x12)	-0.021	
Cost of fuel (x13)	-0.206	
Family Expenditure (x14)	0.034	
Total cost (x15)	-0.012	
Crop Biodiversity (x16)	-0.325	**
Animal Resources (x17)	-0.154	

Table 2 presents the Coefficient of correlation between the return from pulse crop (Y_1) and 17 independent variables.

The following variables have been found to register a significant co-relation with return from pulse crop (Y_1) viz, family members (x4), size of holding (x6), numberof fragments and average size (x7), home-stead land (x9), marketable surplus (x10), marketed surplus (x11), crop biodiversity (x16).

Revelation (Table 2): Return from pulse has gone better for the families having more family members and those having a higher size of holding land. The number of fragments distributed over various topography for the same holding land has offered a better opportunity for pulse crop.

The respondents having a bigger size of home-stead land, more marketable and marketed pulse productionhave contributed to a higher return of pulse crop.

Since the pulse is followed in a rice-fallow cropping sequence, it has been natured choice for farmers with a low value of crop biodiversity.

Table 3: Multiple regression analysis: Return from pulse crop (Y_1) with 17 causal variables

Model	B	Std. Error	Beta	t	sig.
x1	-1.989	9.550	-.018	-.208	.836
x2	53.423	27.679	.188	1.930	.059
x3	48.673	45.213	.097	1.077	.286
x4	85.037	112.729	.148	.754	.454
x5	-73.683	110.332	-.092	-.668	.507
x6	67.767	65.497	.241	1.035	.305
x7	-45.573	47.067	-.211	-.968	.337
x8	-1.995	4.479	-.040	-.445	.658
x9	143.098	63.125	.291	2.267	.027
x10	4.895	8.151	.315	.600	.551
x11	6.701	8.782	.411	.763	.449
x12	53.397	32.191	.204	1.659	.103
x13	-.931	1.342	-.127	-.694	.490
x14	-.575	.438	-.510	-1.314	.194
x15	.655	.435	.686	1.503	.138
x16	180.958	267.774	.077	.676	.502
x17	20.489	140.948	.012	.145	.885

R square 65.9%

The standard error of the estimate: 434.307

Table 4: Stepwise regression analysis: Return from pulse crop (Y_1) with 17 causal variables

Model		B	Std. Error	Beta	t	sig.
1.	x10	10.848	1.240	.699	8.752	.000
	x9	79.808	39.316	.162	2.030	.046

a. Dependent Variable: Y1

R square 58.5%

The standard error of the estimate: 426.057.

Result: Table-3 and 4 present the full model of multiple regression analysis followed by Stepwise regression analysis.

Table-3 presents that 17 causal variables together have explained 65.9 per-cent of the variance of the dependent variable returnfrom pulse crop (Y_1).That indicates that the selected variables for this study have been fairly relevant.

The stepwise regression analysis elicits that two variables marketable surplus (x10) & home-stead land (x9) have come out with stronger determining character on return from pulse crop (Y_1).

Revelation (Table 3 and 4): The causal effect of higher marketable surplus on return from pulse crop (Y_1) is well discernible and higher size of home-stead land here also offers a better indicator for assessing return from the pulse. These two variables have together interpreted 58.5 per-cent of variance embedded with the return from pulse (Y_1).

Conclusion

Pulse is the main source of protein to millions of Indians and cultivation of pulse crop is not economically significant but also ecologically important. It adds protein to the human body, nitrate to soil and resilience to ecology.

The present study has uniquely landed on the value of some important empirical revelation and based on it can be concluded that marketability of pulse crop, along with value addition and branding needs to be enhanced.

The others dimension of the study elicits that both home-stead land and cultivable land, as resources endowed still stance valiant.

Another important thing which comes from the study is that pulse enterprise should be considered a family approach and family enterprise.

Since it's the most dependable provider of protein for the whole family, who otherwise could not effort it by buying it from the market.

This crop has got a big role in stabilizing the national economy by putting up a deterrent to export expenditure in procures pulses from outside India.

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