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Socio economic profile of farmers engaged in millets production in Kalyanpur block of Samastipur in Bihar

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Abstract

Millets are resilient and nutritive grains which help significantly in providing food and nutrition security, especially in areas facing climatic adversities and resource scarcity. The current study was conducted with the objective of analyzing the socio-economic profile of millet farmers and examining the relationship between certain socio-economic characteristics and millet production of the members of Krishi Kalyanpur Producer Company Ltd. (FPO) in Kalyanpur Block of Samastipur district of Bihar. Total sample size comprised 150 respondents and data collection was done by personal interviewing with the help of a structured schedule. Analysis of data was done by descriptive statistics and Pearson's correlation analysis. Results indicated that most of the respondents belonged to middle age (62.00%), Other Backward Classes (84.67%), nuclear families (64.00%) and had farming as their principal occupation (96.00%). Majority of the respondents were marginal farmers (73.33%) with low income and irrigation facilities and 92.00% cultivated millets in an area of less than one acre. Correlation analysis indicated that age ($r = 0.144$, $p < 0.05$), annual income ($r = 0.327$, $p < 0.01$), and farming experience ($r = 0.141$, $p < 0.05$) were positively associated with millet utilization, whereas irrigation source showed a significant negative relationship ($r = -0.220$, $p < 0.01$). The study concludes that promoting extension services, market linkages, and climate-resilient millet production can enhance millet production, improve farmers' livelihoods, and strengthen food and nutritional security.

Keywords: Millets, Food and nutritional security, Socio-economic characteristics, Millet farmers

1. Introduction

"Millets are amongst the oldest food grains known to man and may have been the first to be cultivated for domestic use by man" (ICRISAT, 2021) [6]. Millets refer to hardy small-seeded grasses that flourish as rainfed crops in dry environments with poor soil and moisture conditions (FAO, 2021) [4]. One of the most distinct features of millets is their ability to grow within a very short period. Millets can germinate from the seedling state into fully grown harvestable plants in just about 65 days, thus making them ideal crops in overcrowded and drought-stricken areas (Rao *et al.*, 2017) [8]. Millets are healthy, gluten-free and non-acidic cereals. Hence, they are easy to digest and amongst the least allergic cereals (Saleh *et al.*, 2013) [10]. Due to their slow glucose release and low glycaemic index, which results from their high dietary fiber, millets are ideal for consumption by diabetic patients (Anitha *et al.*, 2019) [1]. Millets are rich sources of essential minerals like iron, magnesium, phosphorus and potassium. Finger millet (*Eleusine coracana*) is an excellent source of calcium and has about ten times the amount found in rice and wheat (Devi *et al.*, 2014) [3]. Unlike rice and wheat, which require high soil fertility and abundant water, millets perform well under rainfed conditions with minimal inputs (FAO, 2021) [4].

India is the world's largest producer of millets, traditionally known as coarse cereals. Owing to their superior nutritional quality, these grains are now recognized as "nutri-cereals" (Government of India, 2018) [5]. Small millets include finger millet (ragi), kodo millet (*Paspalum scrobiculatum*), little millet (*Panicum sumatrense*), foxtail millet (*Setaria italica*), barnyard millet (*Echinochloa frumentacea*) and proso millet (*Panicum miliaceum*) (Rao *et al.*, 2017) [8]. Although they occupy a relatively small share of the total cropped area, these crops play a vital role in ensuring household food and nutritional security, particularly in rainfed and tribal regions of India (Yadav *et al.*, 2016) [11].

Despite millets having high nutritional quality, drought tolerance and low input requirement features, cultivation and consumption of millets is restricted in many areas of India. It is important to consider the socio-economic profile of the farmers since their age, level of education, land holding size, income level, agricultural experience and availability of extension facilities affect millet production and consumption. Analysis of these parameters provides information about the opportunities and constraints prevailing in millet cultivation and consumption at individual and family level. Thus, the current study has been conducted in Kalyanpur Block of Samastipur district, Bihar, among the members of Krishi Kalyanpur Producer Company Ltd. (FPO).

2. Materials and Methods

This current study has been carried out in Kalyanpur Block of Samastipur district, Bihar, where millet production is of significant importance due to its suitability for rainfed agriculture and nutritive value. Purposeful selection of the area for conducting the study has been made as Krishi Kalyanpur Producer Company Ltd., an FPO, has been encouraging the members to cultivate millets.

In this study, 150 respondents have been taken from various villages of the block. These respondents consist of farmers as

well as farm women who were members of Krishi Kalyanpur Producer Company Ltd. A simple random sampling method has been adopted to select the sample of respondents from the FPO members' list to make the selection unbiased. Primary data have been collected by conducting the survey through personal interviews with the help of pretested and structured interview schedule. The interview schedule has been used to gather socio-economic data of the respondents including their age, education, family type, occupation, landholding, income per year, irrigation facility, farming experience and millets cultivation and utilization practices.

The collected data were carefully scrutinized for completeness, coded and entered into Microsoft Excel for statistical analysis. Descriptive statistical tools such as frequency, percentage and mean were used to describe the socio-economic profile of the respondents. Pearson's correlation coefficient was employed to examine the relationship between selected socio-economic characteristics and millet production. Statistical significance was tested at the 5% and 1% probability levels to draw meaningful conclusions.

3. Results and Discussion

3.1 Socio-economic profile of millets farmers

Table 1: Socio Economic characteristics of the study area

S. No.	Variables	Category	Frequency (f)	Percentage (%)
1.	Age			
		18-35 years	47	31.33
		36-55 years	93	62.00
		>55 years	10	6.67
2.	Category			
		Unreserved	6	4
		Other Backward Classes	127	84.67
3.	Gender			
		Male	75	50
		Female	75	50
4.	Family Type			
		Nuclear	96	64
		Joint	54	36
5.	Education			
		Illiterate-	11	7.3
		Can read and write	3	2.0
		primary school	15	10.0
		middle school	18	12.0
		High school	25	16.7
		Intermediate	34	22.7
		Graduate	30	20.0
6.	Family occupation			
		Farming	144	96.0
		Service	1	0.7
		Business	2	1.3
		Any	3	2.0
7.	Irrigation land			
		Marginal (up to 1 acre)	110	73.33
		Small (1 acre to 2 acre)	20	13.33
		Medium (2 acre to 4 acre)	16	10.67
8.	Sources of Irrigation			
		Own Borewell	85	56.67
		No irrigation facility	65	43.33
9.	Economic status			
		Above Poverty Line	56	37.33
		Below Poverty Line	94	62.67

	Annual Income			
10.		Up to Rs.27,000	40	26.67
		Rs. 25,001 to 50,000	73	48.67
		Rs. 50,001 to 75,000	22	14.67
		Rs. 75,001 to 1,00,000	13	8.67
		Rs. 1,00,001 to 1,25,000	2	1.33
11.	Farming Experience			
		5 years	35	23.33
		5-10 years	44	29.33
12.	Millets production			
		Marginal (up to 1 acre)	138	92
		Small (1 acre to 2 acre)	9	6
		Medium (2 acre to 4 acre)	3	2

Social and economic characteristics have always influence on individual' occupation and profession besides other factors. Therefore, total 10 socio-personal characteristics of millets farmers of Kalyanpur block in Samastipur district were studied. Results are presented hereunder with appropriate classifications (Table 1).

The socio-economic profile of the respondents revealed that the majority of farmers and farm women (62.00%) belonged to the middle-age group (36–55 years), followed by 31.33% in the young age group (18–35 years) and 6.67% above 55 years. Most respondents belonged to the Other Backward Classes (OBC) category (84.67%), while the remaining were from Scheduled Castes (SC) and Unreserved (UR) categories. The study included an equal representation of male and female respondents (50% each). A majority (64.00%) belonged to nuclear families and 36.00% lived in joint families. Regarding education, 22.67% had completed intermediate education, followed by graduates (20.00%) and high school education (16.67%). Farming was the principal occupation of most respondents (96.00%). The majority (73.33%) were marginal farmers owning up to 1.00 acre of irrigated land, while 56.67% had access to their own borewell for irrigation and 43.33% had no irrigation facility. Most respondents (62.67%) belonged to the Below Poverty Line (BPL) category and nearly half (48.67%) had an annual income between ₹25,001 and ₹50,000. Farming experience exceeding 10 years was reported by 47.33% of the respondents, followed by 29.33% with 5-10 years of experience. With respect to millet cultivation, 92.00% of the respondents cultivated millets on up to 1.00 acre of land, indicating the predominance of marginal-scale millet production in the study area.

As per the socio-economic profile of the region, it is observed that the cultivation of millet in the region is done mainly by middle-aged cultivators from the OBC group, with the same participation of both males and females. The occurrence of nuclear families, marginal holdings, low annual income and below poverty line (BPL) status is indicative of the resource-scarce scenario prevailing in millet cultivation. The scarcity of irrigation facilities and the experience of the respondents in farming indicate the suitability of millets for low-input and rainfed farming practices. This observation is corroborated by the reports published by Indian Institute of Millets Research (2023)^[7] and Food and Agriculture Organization of the United Nations (2021).

3.2 Relationship between Socio-economic Characteristics of FPO Members and Production of Millets

Table 2: Correlation of Socio-Economic Variables with Production of Millets

Sl. No.	Variables	Correlation value (r)
1.	Age	0.144
2.	Caste	-0.048
3.	Gender	-0.097
4.	Family Structure	0.093
5.	Education	0.000
6.	Occupation	-0.049
7.	Irrigation land	<0.001
8.	Source of Irrigation	-0.220*
9.	Economic status	-0.303
10.	Annual Income	0.327**
11.	Farming experience	0.141

*Correlated with $P < 0.05$ ** Correlated with $P < 0.01$

Correlation analysis was conducted to ascertain the association between some socio-economic characteristics of the FPO members and their production of millets based on the Pearson Correlation Coefficient (Table 2.), where the significance was analyzed at 0.05 and 0.01 levels of probability. According to the findings, age ($r = 0.144$, $p < 0.05$), annual income ($r = 0.327$, $p < 0.01$), and farming experience ($r = 0.141$, $p < 0.05$) were found to have positive and significant association with the production of millets; this implies that aged, high income earning, and more experienced people tended towards production of millets. Source of irrigation was negatively and significantly correlated with the production of millets ($r = -0.220$, $p < 0.01$), meaning that farmers with less irrigation facilities tended to grow and use millets due to its adaptation to the rain-fed and low water requirement environment. Social category ($r = -0.048$), gender ($r = -0.097$), family structure ($r = 0.093$), education ($r = 0.000$), family occupation ($r = -0.049$), and economic status ($r = -0.303$) variables were insignificant in the production of millets.

From the current study, it is evident that the variables such as age, annual income and farming experience had a significant effect on millet production by the FPOs. The older and experienced farmers are expected to be more knowledgeable about traditional crops, thus more confident in growing millets. The higher annual income can enable the farmers to get better quality inputs, market information and facilitate the production

of millets. The negative relationship between millet production and irrigation is due to the adaptability of the millets in rainfed and dry climates, thus the millets become the preferred crop where there is no adequate irrigation. These results are in line with the observation made by Rogers (2003)^[9] and Birthal *et al.* (2014)^[2].

4. Conclusion

The result of the study indicated that cultivation of millet was done mostly by small and marginal farmers who had no proper irrigation facilities, lower income and higher farming experience, which indicated that this crop could be grown on low-input agriculture systems. Farmers belonging to middle age group and equal participation of both genders were seen among the farmers. It was found through correlation analysis that age, income and farming experience had positive impact on the production of millet, while lack of irrigation facilities motivated the farmers to adopt millet because of its drought-resistant nature.

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