

A Study on the Socio-economic Impact on Paddy Farming in Sivasagar District

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(Received 4 June, 2024; Accepted 7 August, 2024)

ABSTRACT

Examples of social and economic difficulties include money, schooling, employment, danger in the area, and community support. Sivasagar district relies heavily on paddy cultivation; the crop is cultivated three times a year. Paddy now occupies 1.06 lakh acres, with mustard taking up the next largest area. The study looks at the impact of socio-economic factors on paddy farming in Sivasagar district. The study utilizes a primary data gathering method to collect responses from 384 farmers involved in rice cultivation who will be randomly selected from the targeted population. The responses are collected with the help of a close-ended questionnaire. These responses are then run through various tools like Excel and SPSS. While Correlation and Regression are used to test the relationship and impact of various socio-economic factors on paddy farming. The findings indicate that there is a positive correlation between "the socio-economic conditions of paddy farmers" and Paddy Farming. There is a significant impact of access to credit and technical knowledge on the profitability and productivity of paddy farming in the Sivasagar District. There is a significant impact of Limited market access, inadequate infrastructure, and insufficient government support on "the socio-economic conditions of paddy farmers."

Key word: Income, Education, Social Support, Paddy farming, Rice production.

Introduction

Growing areas for rice are 163.2 million hectares, and the crop yields an average of 740.9 million tons per year (FAOSTAT, 2014). It is predicted that by 2035, worldwide rice output would need to rise by 116 million tons in order to keep up with the surging demand (Yamano *et al.*, 2016). However, urbaniza-

tion and industrialization have reduced the amount of arable land available for rice cultivation, posing a danger to the sustainability of future increases in global rice production (Long, 2014). In order to increase overall rice output, more frequent rice harvests on the same land have been proposed, as measured by an increase in the multiple crop index (Peng *et al.*, 2009). Double-season rice is the most

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widely used kind of multiple rice cropping, particularly in Asia, while triple-season rice and ratoon rice are also common (Yang *et al.*, 2010). Widespread use of double-season rice systems boosts global rice supply because more rice can be grown on the same amount of land as in single-season rice systems (Ray and Foley, 2013). However, owing to manpower constraints, low degrees of automation, and poor production efficiency, the planting area of double-season rice has been significantly declining in recent years (Xu *et al.*, 2018).

Rice production in India

More than half the world's population consumes rice every day. Asia is responsible for producing and consuming around 90% of the world's rice. Roughly 87% of the world's rice supply comes from only 11 Asian nations. Nearly 35% of all rice exports come from only 8 of these countries. The global food supply is heavily influenced by Asian countries' rice output, particularly India and China. China and India, the world's two biggest economies, are responsible for feeding barely one-quarter of the world's population while producing more than half of the world's rice (Bandumula, 2018). In India, rice is a staple food. In addition, more land in this nation is devoted to growing rice than any other. Given its importance as a staple crop, of course. It's the country's primary crop. One of the largest producers of this crop is India. The staple food crop is rice, which grows well in the hot and humid conditions typical of the tropics. Large quantities of rain occur annually in the locations where rice is farmed. This is why kharif is the primary harvest season for this crop in India. It requires temperatures of 25 degrees Celsius or higher and at least 100 centimetres of precipitation. Irrigation allows rice to be produced in regions that get much less precipitation than the global average. Eastern and southern India relies heavily on rice as their main source of nutrition (Padmini, 2023).

Sivasagar District

Located 363 kilometres east of Guwahati lies the ancient city of "Sivasagar," once known as "Rangpur" (The capital of Assam). Sivasagar was formerly the seat of power for the great Ahoms, who dominated the region of Assam for about 600 years until the British arrived. The Sivasagar tank, which is almost 200 years old, is the town's most striking landmark. Assam's Sivasagar district may be found

in the country's northeast. Sivasagar district may be found between the longitudes of 94.25 and 95.25 and the latitudes of 26.45 and 28.15. According to the 2011 census, 151,9386 people were living in the Sivasagar district throughout its 1,598.85 square kilometres of land. There are a total of five growth nodes, four revenue circles, and two subdivisions. The Sivasagar district is well-known in Assam and India for its biodiversity and agricultural output.

The main agricultural production from Sivasagar district is rice production. The rice production is done three times a year. The production has been done in autumn, winter, and summer. The total production of rice is 207633 MT (Directorate of Agriculture. Assam, 2020). In the total production of rice, the production of winter rice has the highest production among all the seasons. Similarly, winter rice production also has the highest use of land for the cultivation of rice.

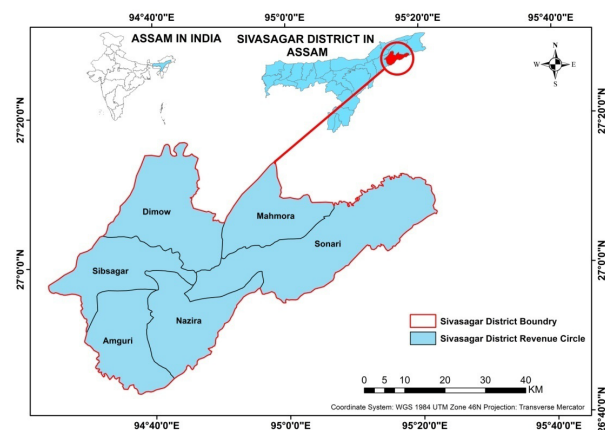


Fig. 1. Sivasagar District Map

(Source: Directorate of Agriculture. Assam. (2020). District-wise Area, Average Yield and Production of Rice for the year 2018-19, Assam. Disaster Management for Agriculture. Retrieved June 27, 2023, from <https://dmagri.in/files/statistics/rice.pdf>)

Socio-economic Factors

Societal and economic situations affect both the quality and duration of our lives. Examples of social and economic difficulties include money, schooling, employment, danger in the area, and community support. The range of opportunities open to a town is influenced by its socioeconomic makeup. Examples of such choices include healthcare, housing, and stress reduction techniques. People in areas

with greater access to healthcare and social services also tend to live longer and be healthier. Having enough money to pay for the basics of life is essential. This includes housing, education, child care, food, and medical care.

Review of Related Literature

To examine the viability and potential advantages of this circular rice production system, Chen, *et al.* (2019) created a hybrid life cycle assessment model to measure social and economic impact. According to the data, the social and economic effects of fertilizer use were significantly affected by how well it was applied. The findings suggested the circular system did not always provide better social and economic outcomes than the traditional linear approach. The study by Yaméogo, *et al.* (2018) investigated the aspects that smallholder lowland rice farmers consider when deciding whether or not to participate in the market. According to the regression findings, differences in market participation between male and female producers suggested the existence of a “gender effect” among farmers. Farmers’ engagement in an organization was often correlated adversely with their choices to participate in the market, according to the findings. Boniphace *et al.* (2015) examined the economic and social factors that influence the inputs used by smallholder farmers in Tanzania’s key rice-growing areas. A higher education level, more crops produced, more animals, and more farm revenue were all shown to enhance the likelihood that a family would employ agricultural inputs, whereas a larger number of livestock and nonfarm income decreased the likelihood.

The study showed that increasing smallholder farmers’ use of agricultural fertilizer requires policymakers and development agencies to priori-

tize long-term measures, such as enhancing farmers’ access to input and output markets, which in turn boosts their earnings. Sapino, *et al.* (2020) built a multi-model ensemble framework with 5 mathematical programming models that represented the observed behaviour of socioeconomic agents in order to simulate the effects of the Piedmontese water pricing reform on land use allocation and management, water conservation, profit, and water tariff revenue. Determined possible breaking points by using scenario analysis. Smallholder rice farmers’ techniques for coping with climate change were examined by Ojo and Baiyegunhi, (2020). The multivariate probit findings indicated that certain families’ adaptation techniques to climate change were statistically impacted by socioeconomic factors, institutional factors, and geographical variables. The next year, Ojo and Baiyegunhi, (2021) evaluated what factors contributed to farmers’ awareness of, and reactions to, climate change and how that awareness affects farmers’ bottom lines. The findings indicated that farmers’ perceptions of climate change are significantly influenced by characteristics such as their location, access to financing, degree of education, and the size of their family. The data also demonstrated how climate change and other socioeconomic factors affect farmers’ income.

In the fields of Yunnan, China, landraces, and contemporary crop types coexist for market-oriented production, and that was the scenario that Dedeurwaerdere and Hannachi, (2019) explored. While agronomic variables do play a role, the study revealed that economic and social motivations were the primary factors that influence individual farmers’ decisions between current crop types and landraces. Nakhon Ratchasima province has the most sugarcane growing area and output in Thailand, thus Sawaengsak and Gheewala, (2017) examined the social and socioeconomic effects of sugarcane production there. The study’s most important results highlighted the importance of such social issues as access to information on sugarcane production, financial aid, natural resources, land rights, land usage, and income. Cultivation methods, natural events, and the dynamic between the sugar mill

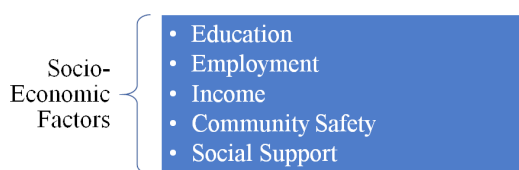


Fig. 2. Socio-economic Factors

Table 1. Paddy farming of Sivasagar district

District	AHU (AUTUMN) RICE			SALI (WINTER) RICE			BORO (SUMMER) RICE			TOTAL RICE		
	Area	Average Yield	Production	Area	Average Yield	Production	Area	Average Yield	Production	Area	Average Yield	Production
SIVASAGAR	244	1468	352	104770	1974	203706	1251	2858	3575	106265	1954	207633

and farmers all play a role in shaping these pressing socioeconomic issues. Using survey data from 15 provinces in Indonesia gathered in 2008, Unggul Heriqbaldi, *et al.* (2015) estimated technical efficiency in rice production and examined the influence of farm-specific socio-economic variables on the technical efficiency. It also indicated that land area, money, and finance all play significant roles in determining technological efficiency. In addition, it was discovered that younger farmers were more productive on average. Technical efficiency and productivity, as well as total rice yield, may be increased by increasing the amount of land used for agriculture, particularly in areas other than Java and Sumatera.

Going through the vast literature available from numerous authors at different databases these objectives have been curated:

- Obj-1.** To assess “the socio-economic conditions of paddy farmers” in Sivasagar District.
- Obj-2.** To analyze the factors influence the profitability and productivity of paddy farming in the Sivasagar District.
- Obj-3.** To identify the challenges and constraints faced by paddy farmers in terms of market access, infrastructure, and government support.

To fulfill the objectives the below-mentioned hypothesis has been curated:

- H1.** There is a positive correlation between “the socio-economic conditions of paddy farmers” and Paddy Farming.
- H2.** There is a significant impact of access to credit and technical knowledge on the profitability and productivity of paddy farming in the Sivasagar District.
- H3.** There is a significant impact of Limited market access, inadequate infrastructure, and insufficient government support on “the socio-economic conditions of paddy farmers”.

Methodology

The paddy is a three-time-a-year main food crop in the Sivasagar area. Paddy now occupies 1.06 lakh acres, with mustard taking up the next largest area. Because of floods, the total area covered by winter paddy also shifts from year to year. The frequency with which floods occur also makes the region unpredictable. Potatoes and legumes are two more major crops. However, the yields from all of these

plants are lower than the national average. The study looks at the socio-economic factors for paddy farming in the area as they will help understand the effect of paddy farming in the Sivasagar district. A sample size of 384 farmers involved in rice cultivation will be randomly selected as the targeted population. Primary data will be collected using a closed-ended questionnaire employing a 5-point Likert scale. The questionnaire will be designed to capture relevant variables related to rice cultivation and its influencing socio-economic factors. Data analysis will be conducted using statistical tools such as Excel for descriptive statistics and SPSS for inferential analyses. Correlation and Regression analysis will be employed to identify the relationships between rice cultivation (dependent variable) and various factors (independent variables) and to examine differences in rice cultivation based on categorical variables. The results will be presented and interpreted, providing insights into the factors affecting rice cultivation in Sivasagar district.

Results

Demographic profile

Table 2 shows “the Demographic Characteristics of the Farmers” in the context of their Gender, Age, Education Qualification, Occupation, and Residence Income. According to Table 2, out of 384 farmers, 60.2% are male and 39.8% are females, which belong to Sivasagar District, the age group of these farmers varies from 20-30 years to More than 50 years, in which most of them belong to the age group of 31-40 years (i.e., 35.7%). The education level of the farmers is defined under 5 categories (i.e., Primary Education, Undergraduate, Graduated, Post- Graduated, and Others) in which most of them had completed a bachelor’s degree (i.e., 33.6%), and their income ranged from Less than 20,000 to More than 60,000, those who had an experience in paddy farming of fewer than 5 years up to More than 20 years, out of these respondents direct seeding was mainly used by the farmers.

Hypothesis Testing

- H1:** There is a positive correlation between “the socio-economic conditions of paddy farmers”. “Pearson correlation of Socio-Economic Conditions and Paddy Farmers was found to be positive and statistically significant ($r = 0.633$, $p < 01$). Hence,

H1 was supported. This shows that an increase in Socio-Economic Conditions would lead to higher effective Paddy Farming in the Sivasagar District of Assam."

H2: There is a significant impact of access to credit and technical knowledge on the profitability and productivity of paddy farming in the Sivasagar District.

The Above table 4 shoes that whether Access to Credit and Technical Knowledge have an influence on the Profitability and Productivity of Paddy Farming. To test hypothesis H2, the dependent variable Profitability and Productivity of Paddy Farming was regressed on the predictive variables Access to Credit and Technical Knowledge. $F = 5.892$, $p < 0.05$, indicating that Access to Credit and Technical Knowledge play a significant role in enhancing the

Profitability and Productivity of Paddy Farming, ($b = -1.131, -0.294$, and 0.347 , $p < 0.005$). These findings demonstrate the favourable impact of Access to Credit and Technical Knowledge on the Profitability and Productivity of Paddy Farming. Furthermore, the $R^2 = 0.030$ indicates that the model accounts for 3.0% of the variation in the Profitability and Productivity of Paddy Farming.

H3: There is a significant impact of Limited market access, inadequate infrastructure, and insufficient government support on "the socio-economic conditions of paddy farmers".

The hypothesis investigates whether Limited market access, Inadequate Infrastructure, and Insufficient Government Support affect "the socio-economic conditions of paddy farmers". To test hypothesis H3, the dependent variable Socio-Economic

Table 2. Demographic profile of the farmers

S No.	Demographic Characteristics	Category	N	%
1	Gender	Male	231	60.20%
		Female	153	39.80%
2	Age	20-30 years	113	29.40%
		31 -40 years	137	35.70%
		41 - 50 years	90	23.40%
		More than 50 years	44	11.50%
3	Monthly Income	Less than 20,000	110	28.6%
		20,000 - 40,000	138	35.9%
		40,001 - 60,000	85	22.1%
		More than 60,000	51	13.3%
4	Education	Primary Education	129	33.6%
		Undergraduate	121	31.5%
		Graduated	74	19.3%
		Post- Graduated	26	6.8%
		Others	34	8.9%
5	How many years have you been engaged in paddy farming?	less than 5 years	129	33.60%
		5 -10 years	147	38.30%
		10 -20 years	70	18.20%
		More than 20 years	38	9.90%
6	Did you receive social support while doing Paddy farming?	Yes	250	65.10%
		No	134	34.90%
7	Which type of social support you are aware of?	Cooperatives and Farmer Organizations	113	29.40%
		Government Subsidies and Schemes	112	29.20%
		Community Networks	64	16.7%
		Farmer Training and Skill Development	70	18.20%
		Others	25	6.50%
8	What is your preferred method of paddy cultivation?	Direct seeding	111	28.9%
		Transplanting	106	27.6%
		Japanese method	69	18.0%
		Broadcasting	66	17.2%
		Others	32	8.3%
9	Do you have accurate knowledge of the technology used in paddy farming?	Yes	241	62.8%
		No	143	37.2%

Conditions of Paddy Farmers was regressed on the predictive variable of Limited market access, Inadequate Infrastructure, and Insufficient Government Support. $F = 115.024$, $p < 0.05$, indicating that Limited market access, Inadequate Infrastructure, and Insufficient Government Support can play a significant role in shaping “the socio-economic conditions of paddy farmers”, ($b = -0.203, 0.702, \text{ and } 1.150$, $p < 0.005$). These findings clearly demonstrate the favourable impact of Limited market access, Inadequate Infrastructure, and Insufficient Government Support on “the socio-economic conditions of paddy farmers”. Furthermore, the $R^2 = 0.476$ indicates that the model accounts for 47.6% of the variation in “the socio-economic conditions of paddy farmers”.

Conclusion

Rice is the staple food for more than half of the world’s population. Asia is responsible for producing and consuming around 90% of the world’s rice. Roughly 87% of the world’s rice supply comes from only 11 Asian nations. The main agricultural production from Sivasagar district is rice production. The rice production is done three times a year. The production has been done as Autumn, Winter, and Summer. The total production of rice is 207633 MT (Directorate of Agriculture, Assam, 2020). People in areas with greater access to healthcare and social services also tend to live longer and be healthier. Having enough money to pay for the basics of life is essential. This includes housing, education, child

Table 3. Correlation

Hypothesis	Factor	Mean	Correlations SD	Pearson Correlation (r)	Sig value	Hypotheses Supported
H1	Socio-Economic Conditions	20.7344	4.77999	0.633	0.00	Supported
	Paddy Farming	20.9557	4.50014			

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4. Regression

Hypothesis	Regression Weights	Beta Coefficient	R	R ²	F	t-value	p-value	Hypotheses Supported
H2	Access to Credit -> Profitability and Productivity of Paddy Farming	-1.131	0.173	0.030	5.896	-2.307	0.022	Supported
	Technical Knowledge -> Profitability and Productivity of Paddy Farming	-0.294				-2.610	0.009	

Table 5. Regression

Hypothesis	Regression weights	Beta Coefficient	R	R ²	F	t-value	p-value	Hypotheses Supported
H3	Limited market access ->Socio-Economic Conditions	-0.203	0.690	0.476	115.024	-0.083	-2.210	Supported
	Inadequate Infrastructure ->Socio-Economic Conditions	0.702				4.837	0.000	
	Insufficient Government Support ->Socio-Economic Conditions	1.150				8.088	0.000	

care, food, and medical care. The study took the task upon itself to investigate the impact of socio-economic factors on paddy farming in the Sivasagar district. For this reason, the study looked at a few objectives like the relationship between “the socio-economic conditions of paddy farmers” and Paddy Farming. The impact of access to credit, and technical knowledge on profitability and productivity of paddy farming. The impact of Limited market access, inadequate infrastructure, and insufficient government support on “the socio-economic conditions of paddy farmers”. The study designed a questionnaire for the farmers in the Sivasagar district and collected the response where the maximum number of farmers are doing farming for 5 to 10 years and the second biggest number of farming years is less than 5 years, and the age of these farmers are between 20 to 40 years confirming the paddy farmers are young adults and people in adulthood. The farmers have also confirmed that most of them (i.e., 65.10%) have received social support regarding farming. They even know about various types of social support like cooperatives and farmer organizations, government subsidies and schemes, community networks, farmer training, skill development, and others like it. These farmers mostly use cultivation methods like direct seeding and transplanting while the Japanese method, Broadcasting, and others are less popular. Most of them even confirmed that have accurate knowledge of the technology used in paddy farming.

The collected data was also run through various statistical tests which also provided results based on the hypothesis. The first hypothesis was tested using the Pearson correlation test which shows that an increase in socio-economic conditions would lead to higher effective paddy farming. The second hypothesis was tested using regression which indicated that access to credit and technical knowledge play a significant role in enhancing the profitability and productivity of paddy farming. The third hypothesis investigated whether limited market access, inadequate infrastructure, and insufficient government support affect “the socio-economic conditions of paddy farmers” using the regression test. It indicated that limited market access, inadequate infrastructure, and insufficient government support can play a significant role in shaping “the socio-economic conditions of paddy farmers”. After carefully analyzing the result through hypothesis testing the hypothesis is all supported, and the final conclusion

is that there is a positive correlation between “the socio-economic conditions of paddy farmers” and Paddy Farming. There is a significant impact of access to credit and technical knowledge on the profitability and productivity of paddy farming in the Sivasagar District. There is a significant impact of Limited market access, inadequate infrastructure, and insufficient government support on “the socio-economic conditions of paddy farmers”. The socio-economic factors do impact paddy farming as the increase in education, income, and employment helps farmers to gain knowledge about the various social support provided to them and even gain knowledge about the various techniques and technologies used in paddy farming. This increase in knowledge will further assist the farmers to increase production and help the community to further grow in the production of rice. This will again help in getting more income, education, and employment and repeat the cycle. The study will help policymakers to find policies that are known to farmers and understand which policies will help them increase the policies and to provide knowledge of other policies of social support which will help them further increase income and productivity.

Acknowledgement

This work could not have been completed without the support of numerous generous individuals. We would like to express our gratitude to Dr. C.K. Kudnar, Associate Professor at SNJB KKHA Arts, SMGL Commerce, and SPHJ Science College, Chandwad, Tal- Chandwad, Maharashtra, 423101, India, for his guidance, advice, instruction, assistance, patience, and many hours spent on crucial edits, rewrites, analysis, and discussions. His exemplary contributions have been instrumental in my journey.

Conflict of Interest

There is no conflict of Interest

Sources of Funding

No external sources of funding

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