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RESEARCH PAPER

Challenges and Opportunities of Rural Agricultural Farmers in Rayagada District of Odisha

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ABSTRACT

Agricultural development has been emphasized by Government of India since independence. More than 23.43% of the nation's GDP comes from the agriculture and husbandry industry. Around 45.76% of Indian workforces are engaged in agriculture and allied production (2022-23 report of National Sample Survey Office). Odisha is endowed with abundant natural resources but it holds 13th rank in economic contribution in India (report of Odisha economic survey, 2023-24). The total rural population in India is 63.64% (World Bank report, 2024), and 83.31 % in Odisha (Census report, 2011), but 48.8 percent workforce is engaged in agricultural sector (Government of Odisha report, 2024). Current population of Odisha is 41,974,218 and Rayagada district is 820,945. Total agricultural land in Odisha is reported as 6,782 000 ha, where as Rayagada district accounts for 1, 93,504 hectares with high - 1, 28,962 ha, medium - 42,705 ha and low 21,837 ha. Rayagada's agro-climatic zone is north eastern ghat having 9,67,911 population. Soil type is brown forest, lateritic, red alluvial, black and mixed red soil groups. The farmers produce mainly rice and cotton. They also depend on forest products as subabool, cashew, oil palm and teak trees. The study reveals that farmers face main challenges as unfavorable climatic condition, lack of education, low awareness of agricultural facilities, low investment and return, lack of infrastructure, low interest in agricultural work, lack of research and knowledge for more prospects and land consolidation. Further, there is a positive coefficient between infrastructure and education with agricultural development.

HIGHLIGHTS

- A rising trend in agricultural production in Rayagada districts of Odisha.
- The farmers face main challenges for large investment in agriculture, lack of infrastructure, low productivity, lack or research.
- A positive correlation coefficient between infrastructures, education with agricultural development.
- Farmers are mainly producing paddy and cotton, but opportunity is there for horticultural crop and livestock poultry in upland, mushroom cultivation and dairy farming in medium land and fishery, vermicompost and *azolla* in low land.

Keywords: Rural Agriculture, Farmers' Challenges, Economic Growth, Farm mechanism

Government of India has been constantly emphasizing on agricultural development, starting from 'green revolution' of first five year plan to 'agricultural infrastructure fund' in 2024, which facilitate assistance to agricultural farmers for their sustainability, economic development and contribution to gross domestic product (GDP) and Net State Domestic Product (NSDP). The state typically receives 14.51.2 millimeters of rain and Rayagada accounts for 1030.21 mm to 1569.50 mm annually (report of Govt. of Odisha). Gross cultivated area of Rayagada district is 193.50 ha and net is 218.39 ha, gross irrigated area is 84.75 ha and net 60.848 ha. The state has a tropical climate, which

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is defined by warm temperatures, high humidity, moderate to heavy precipitation, and mild winters. The primary crop in the state of Odisha is the *kharif* paddy. About one-third of the state's land is under cultivation, with rice being grown on roughly three-fourths of those fields. Major crops in Rayagada district are paddy and cotton but they also grow arhar, ragi, maize, oilseed (sunflower, sesame) Major fruit crops- Mango, pineapple, jackfruit Plantation crop- Cashew nut and oil palm. Of the total cropped area (TCA) of Rayagada, 27.4% area is irrigated and remaining 72.6% is under rainfed (Report of District level implementation committee, 2016, Govt. of Odisha).

LITERATURE REVIEW

The trends in the agriculture and industry sectors from 2010 to 2020 were almost constant; however, in 2021, the share rose. The service sector has held a larger share over the period than two other sectors: the agricultural and industrial sectors converge in 2020–2021, compared to 2010 (Thakur *et al.* 2024). The educational level of agricultural farmers in Rayagada is low. They show medium level of caliber in innovation, risk taking ability, motivation and farming commitment. Further they show low extension contact and have less exposure to mass media (Mounika *et al.* 2023). Kumar *et al.* (2022) have identified that the natural calamities, dependency on rainfall, lack of irrigation facilities and declining of net sown area are the major challenges of agricultural farmers. Barik (2024) has identified a number of problems contribute to Odisha's low agricultural production like climate, natural disasters, inadequate irrigation infrastructure, a lack of a proper market system and a labor shortage for farming. Hoda *et al.* (2021) identified that roads, irrigation, and diversification are crucial for the expansion of agricultural GDP (Gross Domestic Product) for Odisha. According to Das *et al.* (2024), agriculture is significantly contributing to GSDP (Gross State Domestic Product) and providing employment too. However, due to urbanization, the area of crops and cereals are decreasing where as pulses area is increasing. It clearly indicates that farmers are more interested for producing non-food grain products. Since the cropping intensity in Odisha is below the national average, it is necessary to determine the role of technology.

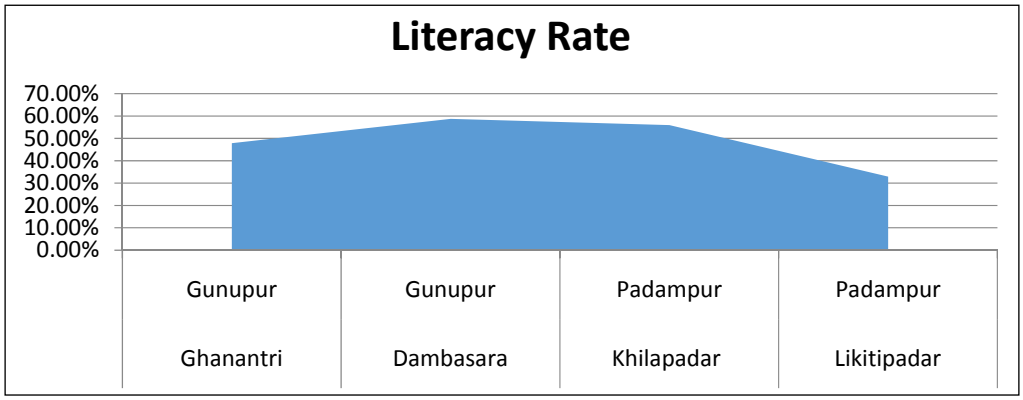
DATABASE AND METHODOLOGY

The present study is based on both primary and secondary data. A secondary source of data has been collected from Census report, World Bank report, and report of National Sample Survey Office, Department of Agriculture and Farmer's Welfare, Odisha. Primary data have been collected randomly from 148 village farmers. Initially different blocks were taken from district agriculture office and then two blocks were selected randomly, Gunupur and Padampur. Further, list of villages were prepared. Then two villages were selected randomly from each block, Ghanantri and Dambasara of Gunupur and Khilapadar and Likitipadar of Padampur block. Then the lists of the houses have been collected from block office, i.e. 367 households in Ghanantri, 637 in Dambasara, 305 in Khilapadar and 141 in Likitipadar. Afterward, 35 households were selected from each village. Finally, 148 farmers have been selected for the study. A transect walk has also been done in the selected area. A five-point scale structured questionnaire varied from (5 = strongly agree to 1 = strongly disagree) was administered to farmers, but they were briefed wherever they had any problem in any question. Discussion was also done with the government officials, local leaders and senior farmers to take their expert opinion for initial validation of the questionnaire. Reliability was taken care of by applying Cronbach's alpha (0.738). SPSS 20.0 has been used for the study.

DATA ANALYSIS

The total geographical area of Ghanantri village is 369 hectre, Dambasara- 369 ha, Khilapadar-665 ha and Likitipadar - 654 ha. Ghanantri village is endowed with black clay soil in upland, clay loam in medium and the combination of both in low land, Dambasara with Red and Alluvial soil, whereas Khilapadar village gifted with red soil in upland, red and black in medium and only black soil in low land and Likitipadar with black soil with a clayey texture.

An attempt was made to know the interest and understanding level of farmers about cultivation and their available resources. Few dimensions were emphasized for the same. In demographic variable, literacy rate of four villages (Ghanantri, Dambasara, Khilapadar and Likitipadar) of two different blocks, Gunupur and Padampur shown in Fig. 1.



Source: *Census report, 2011*

Fig. 1: Literacy rate of sample villages of Rayagada district

Table 1: Mean and standard deviation score of farmers in various education variations.

Sl. No.	Variables	Illiterate		Below Matriculation		Intermediate & above	
		Mean	Sd	Mean	Sd	Mean	Sd
1	Lack of Infrastructure	3.75	0.93	3.82	0.91	3.39	0.89
2	Agri. Devt.	3.15	0.78	3.55	0.78	4.43	0.84
3	Unfavorable Climatic Condition	4.12	0.62	3.95	0.86	3.79	0.72
4	Low awareness of agricultural facilities	4.15	0.76	3.78	0.62	3.15	0.59
5	Low investment and return	4.48	0.86	4.14	0.66	3.13	0.53
6	Low interest in agri. work	3.88	0.83	3.25	0.68	4.12	0.62
7	Lack of research & knowledge on agri. prospects	4.47	0.98	4.32	0.87	4.12	0.73
8	Agri. Prospects	3.91	0.81	4.12	0.78	4.28	0.72
9	Unfavorable climatic condition	3.28	0.56	3.23	0.62	3. 65	0.68

Source: *Own data (No. of Respondents = 148).*

The Fig. 1 depicts that Dambasara village shows the highest literacy rate (58.80%) out of which 77.00% are male and 33.00% are female. Similarly, Khilapadar accounts for 56.00% of literacy. Out of the total male of the village, 66.35% are literate and 46.14% are female. Ghanantri domiciles literacy rate is 47.90% (58.76% Male & 37.16% are female). Finally, Likitipadar shows the lowest literacy rate, i.e. 32.95% (69.19% Male & 30.81% are female). Further, Mean and standard deviation of farmers are presented in table 1 in education variation.

The mean and standard deviation values of respondents are shown in table 1 in education variation. It is observed that highest mean score is obtained in low investment and return variable in illiterate and below matriculation group ($\overline{X}$ = 4.48 & 4.14 respectively) where as lowest mean score is found in agricultural development ($\overline{X}$ = 3.15 & 3.55) variable. Lack of research & knowledge on agricultural prospects variable also has obtained high mean scores in all age groups ($\overline{X}$ = 4.47, 4.32 & 4.12 respectively). The variations in infrastructure variable is high too (SD = 0.98, 0.91 & 0.89 respectively) in all age groups.

The study has also adopted a transect walk method in the selected area of both the sample blocks and got the ground level information by interacting farmers and observation. The above table 2 shows that the villages having different types of land with different soils, but they are only growing rice and cotton as the major crops and horticultural crops like okra, brinjal, tomato, pumpkin, chilli, mango, coconut, Indian almond, lemon, krishnachura banyan etc. Through transect map, it is observed that most of the village area is under low and high land, soil type is sandy loam and clay loam. Major crops grown were rice and cotton. And there is a good scope for integrated farming system, mushroom unit, zola

Table 2: Transect Walk Report of the Selected Area

Parameters	Categories		
Land Type	**Up land**	**Medium land**	**Low land**
Soil	Red Soil +Black-clay Soil	Red + Black Soil + Clay loam	Black Soil + Black-clay Soil+ Clay loam
Crops	Paddy	Paddy + Cotton	Paddy + Cotton
Water Resources	Canal	Tube well	Tube well + Pond
Houses	*Pucca* Houses	*Pucca + Kutcha*	*Pucca + Kutcha*
Community Resources	Post Office	Anganbari + School- Rajiv Gandhi Sewa Kendra	Transformer, Community Hall
Livestock	Cattle	Cattle + Poultry	Poultry
Vegetation	Okra + Brinjal + Mahula Tree	Mango + Neem + Banana	Tomato + Papaya + Coconut Tree
Agro related Problems	Water scarcity	Weed Infestation – Insect Pest Attack	Water stagnation + Weed Infestation
Opportunities	Horticultural Crops+ Mushroom cultivation	Dairy farm, Unit + Vermi compost unit	Poultry Farming

Source: *Own data during transect walk.*

culture, Fish farming and poultry farm. Most of the houses are mixed type in all areas. The major water sources are tube well and government supply water for drinking purpose where as bore well and rainwater for irrigation. Majority farmers responded that the problem of this village is infrastructure, i.e. transportation (61%) and water stagnation (53%) in low land. They have some great opportunities for green mannuring, mushroom cultivation, vermin compost unit, rice-*azolla* cultivation.

Table 3: Co-relation matrix for the Educational level, infrastructure and agricultural development

Correlations				
		Edu level	**Infrastructures**	**Agricultural development**
Edu level	Pearson Correlation	1	.338**	.478**
	Sig. (2-tailed)		.000	.000
	N	148	148	148
Infra-structures	Pearson Correlation	.338**	1	.656**
	Sig. (2-tailed)	.000		.000
	N	148	148	148
Agri-cultural develop-ment	Pearson Correlation	.478**	.656**	1
	Sig. (2-tailed)	.000	.000	
	N	148	148	148

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

Table 3 indicates the 2-tailed significant correlation between infrastructure and educational level of the farmers with agricultural development. It is observed that educational level is positively correlated with infrastructure (r = .338, p<.01) and agricultural development (r =.478, p<.01). Similarly, infrastructure variable is positively correlated with agricultural development (r = .656, p<.01).

Table 4: Model Summary of Regression results of Agricultural development with Infrastructure and Educational Level

			Model Summary[b]	
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.710[a]	.505	.498	.617

a. Predictors: (Constant), infrastructures, Edu level.

b. Dependent Variable: agricultural development.

From the above regression model in Table 4, The R-value (.710) shows a positive correlation coefficient determination between the dependent variable and predictors. It is observed that agricultural development explains combined R^2 with infrastructure and educational level. The variable has yielded R square value of 0.505 predicting 50.5% of the variances. It explains that agricultural development is majorly dependent on jointly with two factors, i.e. lack of infrastructure and low educational level. It means there are other factors (of 49.5% dependency) which are responsible

for the agricultural growth and development of farmers in Rayagada district. The further research can explore those factors in future.

From the primary and secondary data combined with discussion with government officials, experts, local leaders and transect walk observation, it has been observed that soil type is mostly brown forest, lateritic, red alluvial, black and mixed red soil groups. The farmers produce mainly rice and cotton. Among paddy variety, MTU-1001 is the most profitable variety among others as it is cultivated in highest area and having most demand for market. There are solar water pumps, tube wells, wells, farm ponds, canals etc. But still blocks are facing irrigate facility at times. The major inflow resources of the villages are hybrid seed, seedling, pesticides, fertilizers, grocery and the major outflow resources are rice, cotton, chilli, tomato, etc. They also grow okra, brinjal, mango, banana, papaya, subabool, cashew, oil palm etc. In trees, they grow mahula, coconut, neem and teak basically.

Personal discussion helps to know the ground reality of farmers. Some of them are unaware of various fertilizers and pesticides to use in farming. Their paddy is mainly affected by BPH (Brown Planthopper) and Blast. And they can't control it because of lack of knowledge in pest management. For whatever problem in paddy or plants they know only one pest and apply for all plant diseases. Sometimes, pesticides are also not available in nearby shops. They hesitate to go next city or big market to buy those. Most of the village population belongs to poor category. They mostly depend on farming for their income. They don't have their own land. Most of the farmers are less educated or illiterate which hinders their growth in agriculture.

They face the additional challenges like migration of youth, pressure of middlemen, and high cost of cultivation of cotton. The farmers engaged throughout the year. They get their maximum income during October to December. Expenditure is highest during June- July and Oct- Nov. Most of cattle disease occurred there during Oct- Dec and human disease throughout the year. Insect- pest and disease infestation is more during the month of Sep- Dec.

There is opportunity of income generation through vermi-composing, mushroom farming, dairy products, more vegetable cultivation plantation crops, horticultural crops, poultry farming etc.

CONCLUSION

The study has focused on the farmers' perspectives although there is the contribution of government officials, local leaders and senior farmers too. There are various types of farmers engaged in agriculture in Rayagada, Land owners, small holders and marginal farmers, agricultural labourers. Lack of infrastructure facility and unfavorable climatic condition has become the major constraints for their growth. Their strength is they have large amount of area, moderate availability of machines, to some extent availability of irrigation, self confidence, independent farmers, and cultivation of horticultural crop throughout the year. But at the same time, irrigation facility is not sufficient and available in all areas. They face very often unfavorable climatic condition, lack of infrastructure, adequate marketing facility.

As most of the farmers are financially weak, they are unable to invest more on advanced technology. They lack in agricultural development, which is mainly due to lack of education, research and knowledge on agricultural prospects. They also invest very less in agriculture so get less return. They earn less profit for which they lack interest in farming. Many youngsters are not willing to be engaged in agriculture and desire a job with less hard work and tension. As in agriculture, income is not fixed and dependence of weather. However, Government of Odisha is trying its best to bring them in mainstream by applying various developmental schemes.

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