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Factors Affecting Participation in Paddy Royalty Scheme among Farmers of Kerala

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ABSTRACT

Paddy Royalty scheme is a financial incentive mechanism formulated on the basis of payments for ecosystem services (PES) concept, wherein the paddy wetland owners were compensated for the ecosystem services that their resource provided. This study attempted to estimate the farmer participation in paddy royalty scheme. The factors that affected farmers' participation was analyzed in a logistic regression framework, using the primary data collected from randomly selected 118 paddy farmers from Kole wetlands of Kerala. Further, it was also tried to identify and rank the constraints that limited the farmer response towards the scheme. The farmers' participation in the year 2023-24 was 57% but only 40% of the farmers were willing to participate in next year. Education, land holding size, farmer association membership and digital literacy were found to be positively influencing the participation whereas age influenced negatively. The most severe constraint identified was insufficiency in royalty amount followed by high transaction costs. Adopting a comprehensive approach that includes better programme design, increased incentives and supportive policies, the government can encourage greater participation to achieve the primary scheme objectives of sustaining paddy cultivation and preserving wetlands, thereby ensuring the food security and ecological sustainability in the state.

Key Words: Eco-compensation, Kole wetlands, Logistic regression, Payments for ecosystem services.

INTRODUCTION

The payments for ecosystem services (PES) concept envisioned an incentive mechanism where natural resource owners were compensated for the ecosystem services that their resource provided. The paddy royalty scheme in Kerala was evidently inspired by the essence of payments for ecosystem services (PES) concept was one such effort wherein the paddy wetland owners were financially incentivised for the ecosystem services that the wetland provided. Wunder (2015) defined PES as the conditional cash transfers provided to natural resource owners intending to encourage the ecologically beneficial activities. PES programmes had also been widely referred as eco-compensation programmes or agri-environmental schemes, representing a strategic approach to environment conservation by offering incentives for activities that sustain or enhance unpaid ecosystem services such as biodiversity conservation, water quality improvement, carbon sequestration, soil preservation, ground water recharge etc. In recent times, PES had emerged as a key instrument for ecosystem conservation, while simultaneously enhancing the livelihoods of farmers who act as environmental service providers (Le *et al*, 2024; Wunder *et al,* 2020).

The Paddy Royalty scheme was introduced in Kerala with an intention to protect the remaining paddy wetlands, addressing the serious challenges of depletion, degradation, and conversion mainly due to housing expansion and real estate development. The Wetland agro-ecosystems refers to agricultural systems that are situated in or near wetland environments. These ecosystems often emphasize sustainable

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agricultural practices to minimize environmental impacts. This may include practices such as integrated nutrient management which is widely recognized as a sustainable strategy that enhances agricultural productivity and soil health over the long term (Thulasi *et al*, 2022), integrated pest management to improve soil and water quality (Sharma *et al*, 2021), conservation tillage to promote biodiversity, soil health and water conservation, organic farming etc. Besides, wetlands provide various non-marketed ecosystem services such as water filtration, flood control, carbon sequestration, nutrient recycling, ground water recharge, biodiversity conservation etc.

The Kole wetlands in Kerala are unique sub-sea level rice production wetland agro-ecosystem spread over Thrissur and Malappuram districts, covering an area of 13632 hectares. They are one of the most productive as well as threatened wetland in Kerala State (Jayson and Sivaperumal, 2005). Kole lands are multifunctional wetland agro- ecosystem with high ecological significance and were declared as Ramsar site in 2002 (Srinivasan, 2011). The total economic value which comprises direct, indirect and non-use values of the Kole wetlands was estimated as Rs. 3905 lakh per year which implies a value of Rs.3.23lakh/ha/year (Tamhankar, 2021). Despite their potential benefits, Kole wetland agro-ecosystems also face challenges such as land conversion, ecosystem degradation, habitat loss, climate change and conflicts over land use. Harithalekshmi and Ajithkumar (2023) has reported that the warming climate is reshaping the hydrological cycle of major agro-ecosystems in Kerala , with profound effects on precipitation patterns and intensities. Therefore, balancing agricultural production with the conservation of wetland ecosystems requires careful planning and management to ensure long-term sustainability.

The Paddy Royalty scheme which nearly resembled a PES programme, was initiated by State government of Kerala in the year 2020-21, for the conservation of paddy wetlands. This scheme offered a royalty amount of Rs. 2,000/ha/year to the landowners of cultivable paddy land. The primary objective of the scheme was to incentivize the retention and cultivation of paddy fields, particularly wetlands, thereby addressing the significant decline in paddy cultivation over recent decades. This initiative not only supports sustainable agriculture but also preserves vital ecosystems and enhances the economic well-being of local farmers.

Despite its intended benefits, the scheme has turned up a low participation rate among wetland farmers. According to the official reports, in the year 2021-22, the total number of royalty applications received for Thrissur and Malappuram districts together were 11509, covering an area of 4676 ha. This implies that even one-third of the wetland farmers have not applied for royalty in the initial year. In the year 2023-24, the royalty amount was increased to Rs. 3000/ha/year. Apart from that, on an average farmer is receiving a total assistance Rs. 32860/ha in form of various subsidies for paddy cultivation. In May 2024, it was found that the cumulative number of royalty applications received since inception for both the districts were 47095. Out of that, 77% of applications got approved , 17% got rejected and 6% were still in processing status (https://dashboard.kerala.gov.in/e-services/service.). The statistics clearly highlights that the royalty scheme failed to enthuse wetland paddy farmers. In this context, the present study attempts to identify the constraints that limit the farmer response towards the scheme and the severity of the constraints is ranked according to farmer perspectives. The actual farmer participation and the willingness to continue the participation was also estimated. Further, the factors influencing the participation were analysed and the preferences from farmer side was documented.

MATERIALS AND METHODS

Study area and sampling

Thrissur Kole wetlands being one among the major paddy producing area recording high rice productivity in the state as well as having high ecological significance was selected as the study area. The Thrissur Kole area is spread over 8 block panchayaths in Thrissur district. The study was solely based on the primary data. The three block

Table 1. Socio-economic characteristics of sample farmers.

Sr. No.	Particular	Sample average (N = 118)
1.	Age (Years)	57
2.	Education (Years)	9
3.	Experience (Years)	24
4.	Average monthly income of farm household (Rs.)	11,642
5.	Farm household size (Number of family members)	4
6.	Kole land area (H actares)	0.62

Table 2. Farmer awareness, participation and willingness to continue participation in paddy royalty scheme.

Sr. No.	Particular	Awareness (%)	Registered in scheme during 2023-24 (%)	Willingness to register in scheme during 2024-25 (%)
1.	Marginal farmers	81.17	49.41	28.23
2.	Small farmers	96.55	75.86	68.96
3.	Large farmers	100.00	100.00	100.00
4.	Total	85.59	57.62	40.67

panchayaths namely Anthikkad, Puzhakkal and Mullassery having the highest number of wetland paddy farmers, were selected at the initial stage. In the next stage, 118 sample farmers were randomly selected from the *krishibhavan* wise farmer list. The primary data on socio-economic status, Kole land area, Paddy Royalty scheme awareness, participation details, willingness to continue the participation, perspectives and preferences, transaction costs of participation, digital literacy etc were collected from farmers through personal interview method using pre-tested structured interview schedule. The digital literacy score was obtained depending upon the parameters such as smart phone ownership, social media participation, knowledge gathering from online sources and application submission by self or by family members or through Akshaya centres. Transaction costs of participation include all extra costs incurred starting from Paddy Royalty scheme application submission, follow up etc, till the receipt of royalty amount. Focus group discussions were also carried out to identify the constraints of participation. The survey was carried out during April to May of the year 2024-25.

Analytical tools

The relative severity of identified constraints was rated using relevancy rating method. The farmers were asked to rate the severity of the constraint on a five-point relevancy continuum i.e. no decision, not severe, less severe, moderately severe and highly severe. The ranks assigned were 0,1,2,3, and 4 respectively. The problem with highest relevancy coefficient is ranked first is of highest severity. The following formula was used to work out the relevancy coefficient (R_i) for the i^{th} constraint (Rose and Prema, 2021).

A binary choice logistic regression model specified in equation (1) was used to analyse the factors that influence the probability of Kole wetland farmers participating in Paddy Royalty scheme. Descriptive statistical methods were also used as per the requirement.

$$L_i = Ln [P_i / (1-P_i)] = \alpha + \Sigma \beta_i X_i + \varepsilon_i \ldots..(1)$$

P_i = Probablity of Paddy Royalty scheme participation (Yes = 1)

$1-P_i$ = Probablity of Paddy Royalty scheme non-participation (No = 0)

α – Intercept, ε_i - Error term, β_i – Regression coefficients, X_i – Independent variables

Independent variables considered were X1 – Age (years), X2 – Education (years), X3 – Gender (Male = 0, Female = 1), X4 – Farm house hold size

Table 3. Estimates of logistic regression.

Sr. No.	Independent variable	Coefficient	Std. Error	P value
1.	Age	-0.0643*	0.0378536	0.090
2.	Gender	0.1538	0.4884538	0.753
3.	Education	0.2397***	0.1018788	0.010
4.	Farm household size	-0.0838	0.2057273	0.684
5.	Average monthly income	-1.03e-06	0.0000361	0.977
6.	land holding size	1.0351***	.2681472	0.000
7.	Farmer association membership	1.9932*	1.229756	0.100
8.	Digital literacy	0.4451**	0.218484	0.042
9.	Constant	-7.144613	3.458575	0.039
10.	Number of observations	118		
11.	Log likelihood	-62.896055		
12.	Prob > chi2	0.0000		

*Notes: ***denotes P < 0.01, **denotes P < 0.05, *denotes P < 0.10*

(Number of family members), X5 – Average monthly income (Rs.), X6 – Kole land area (Ha), X7 – Farmer association membership (Yes = 1, No = 0), X8 – Digital Literacy (Score).

RESULTS AND DISCUSSION

Socio-economic characteristics

The socio-economic characteristics of the sample farmers were given in table 1. The average age was 57 indicating the involvement of older generation in wetland paddy farming and were highly experienced in sub-sea level farming. All sample farmers were literate with an average education of 9 years. Small farm house holds were dominant in the study area with an average Kole land holding size of 0.62 ha. As the average land holding size is small, the farmers were classified based on the total land holding size as marginal (< 1ha), small (1 – 2 ha) and large (> 2ha). Majority of the farmers (72.06%) participated in the survey belong to marginal category.

Awareness and participation status

Awareness about the paddy royalty programme in Kerala, was important for the success of the scheme. The results (Table 2) showed that the farmers were highly aware of the scheme. The major sources of information were social media, peer group discussions like farmer association meetings and also from *krishibhavans*. Majority of the farmers (86%) knows the details of the scheme such as royalty amount, application procedure etc but only 28 per cent has clearly understood the objectives. Therefore, it was essential to impart vital knowledge about the eco-compensation payments for not only supporting the economic well-being of the farmer but also to contribute to the ecological sustainability of the region.

The data on farmer participation in Paddy Royalty scheme presented in Table 2 provided valuable insights into how different categories of farmers perceive the scheme. There was a clear mismatch between the awareness level and actual participation. Only 57 per cent of the farmers actually participated in the Paddy Royalty scheme in 2023-24 and less than half of the farmers were willing to register for the scheme in next year. The results indicated the dissatisfaction at farmer level and points towards the deficiencies in paddy royalty programme design and implementation. The reluctance from farmer side was highest among the marginal farmers followed by small and large farmers.

Factors influencing farmer participation in paddy royalty scheme

The results of logistic regression analysis presented in Table 3, provided insights on various variables significantly affect the likelihood of

Table 4. Severity ranking of participation constraints in paddy royalty scheme

Sr. No.	Identified constraints	Relevancy coefficient	Severity ranking
1	Insufficient royalty amount	0.7458	I
2	High transaction costs	0.7225	II
3	Irregular payment release	0.5996	III
4	Complex application procedure and follow up	0.4492	IV
5	Delay in application processing and approval	0.4279	V

farmers enrolling in the Paddy Royalty scheme. The variables such as education, Kole land holding size, farmer association membership and digital literacy were found to be positively and significantly influence the probability of participation in the scheme. Conversely, the age of the farmer was found to have negative and significant effect on probability of participation. At younger ages, the probability of participation in scheme was high, but the probability decreases as the farmer gets older. Therefore, young farmers had prime involvement in the scheme. Education increases the likelihood to participate in the scheme like any other new programme, as the educated farmers can better process information which in turn creates a more favourable mental attitude towards an innovative action. Thakur and Pandya (2021) also reported that the variable education had positively and significantly affected farming decision making and participation.

The land holding size was the most important factor that influenced participation as the royalty amount was directly proportional to the Kole land area. Higher the acreage, higher will be the royalty amount resulted in higher participation rate. Another probable reason was that the large farmers would have more availability of resources that facilitated the participation. The reason for the significance of farmer association membership variable could be the fact that farmers discuss new information and scheme details in group meetings, peer discussions etc which may motivate farmers to participate. As the participation was restricted through online mode, digital literacy factor becomes crucial. The digital literacy imparts knowledge about the scheme, stimulates farmer enthusiasm and facilitates farmer to submit application and further follow up activities in online mode. Thus, the digital literacy becomes the key element that improves participation.

Participation constraints in paddy royalty scheme

The major constraints identified and the severity ranking is listed in Table 4. According to the farmer response, the most limiting factor was the insufficient royalty amount which failed to incentivize the farmers adequately. The eco-compensation amount was incomparable with the expenses of maintaining the wetland agro-ecosystem. The royalty amount together with all forms of subsidies accounts for only 11 per cent of the per hectare total economic value of ecosystem services provided by Kole wetlands. Therefore, the farmers were incentivised only marginally for conserving and providing the ecosystem services. A revision in quantum of incentives as well as scheme design on a scientific basis was a pressing priority. The second severe constraint was the transaction costs involved. The farmers reported that the extra efforts or costs involved right from submission of application till the receipt of amount was considerably higher when compared to the eligible royalty amount. The irregularity in payments was ranked as the next important constraint. Farmers report that they received royalty amount of 2020-21 and 2021-22 but the payments for 2022-23 and 2023-24 were not released as of April 2024. The complex application procedure and its follow up is another limitation. The combined one-time application for yearly farming activities has to considered instead of submitting various applications for same farming activity. In some cases, unexplained delay was observed in processing and approval/rejection of applications.

Farmer perspectives and preferences about paddy royalty scheme

The majority of farmers (94.81%) opined that a better paddy royalty programme design required exclusively for Kole lands. The farmer

preferred cash incentive at higher rates in proportional to the yearly maintenance cost of wetland ecosystem. More than half of the farmers also supported for a combination of cash and in-kind incentives through Paddy Royalty scheme. Most of the farmers (90.43%) preferred regular quarterly or half yearly payments prior to the cropping season. The proportion of farmers supported one-time or lump sum payment once in three years was 12.30 per cent and 8.79 per cent of farmer demanded additional land tax exemption incentives.

CONCLUSION

PES programmes offer a promising approach to conserve ecosystems by aligning economic incentives with environmental objectives. However, careful design, implementation, and monitoring were essential to maximize its effectiveness and to address potential challenges. A clear mismatch between the awareness level and actual farmer participation was obvious in the study. Only 57 per cent of the farmers actually participated in the Paddy Royalty scheme in 2023-24, while less than half of the farmers were willing to register in 2024-25. The royalty amount together with all forms of subsidies accounts for only 11 per cent of the per hectare total economic value of ecosystem services provided by the Kole wetlands. Therefore, farmers were incentivised only marginally for conserving wetlands and providing the ecosystem services. The continued diminishing response to the paddy royalty scheme in Kerala highlights the need to address the problems of insufficiency as well irregularity in royalty payments along with enhanced efforts to improve the digital literacy among farmers and to simplify the application process for reducing the transaction costs. Adopting a comprehensive approach that includes better program design, increased incentives, and supportive policies, may foster greater participation and will help to achieve the primary objectives of scheme such as sustaining paddy cultivation and preserving wetlands, which in turn ensures food security and ecological sustainability.

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