

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 10; October 2024; Page No. 486-490

Received: 09-08-2024
Accepted: 13-09-2024

Indexed Journal
Peer Reviewed Journal

Understanding constraints of seed producers: An analysis of registered seed growers programme in Kerala

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DOI: <https://doi.org/10.33545/26180723.2024.v7.i10g.1265>

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Abstract

The Registered Seed Growers Programme (RSGP) is a comprehensive initiative of Kerala state to promote a formal rice seed system and ensure quality seeds to farmers. Since the State has been initiating the programme over two decades, an investigation into the constraints of seed producing farmers would suggest required modifications. The study was purposively conducted in Kollengode and Kuzhalmannam blocks of Palakkad district, having the highest area under seed production. About 150 farmers from eight padasekharams practicing seed production under RSGP for a minimum of five years, were randomly selected to constitute the sample. Major constraints identified in focus group discussion were subdivided into socioeconomic, technical, environmental, and institutional dimensions. Farmer-ranked constraints according to severity were exposed to rank based quotient. Delays in seed procurement, shortage of skilled labourers for specialized practices, drought or intermittent water stress and insufficiency in seed testing labs were the prime constraints of farmers. Addressing these constraints is crucial for optimising seed production and distribution.

Keywords: Rice, seed producing farmers, RSGP, formal seed system

Introduction

Seeds are the fundamental component of agriculture, contributing significantly to crop yield, surpassing the impact of other production inputs ^[1, 2, 3]. The genetic component of seeds is a critical factor in determining crop yield potential and stability ^[4]. High-quality seeds catalyze agricultural progress ^[5], playing a vital role in enhanced production, productivity, food security, and livelihood improvement ^[6, 7, 8]. Quality seeds encompass rigorous seed standard of genetics, physical characteristics, health, germination rates, moisture content, and vigour, ensuring optimal yield potential ^[9, 10]. Low quality seeds can render farmer's investments in other agricultural inputs futile ^[11]. Continuous crop improvement and innovations in seed supply chain are crucial for sustained agricultural productivity ^[12, 13, 14].

The seed system involves a network of seed supply channels, facilitating seed access for farmers depending on the required variety, price, and availability ^[15]. A sustainable seed system ensures the availability of seed in sufficient quantities and qualities to the farming community. Conventionally, seed systems are categorized into two distinct types: informal and formal, with the latter characterized by regulatory frameworks, seed certification, property rights, and guaranteed seed variety authenticity. Formal seed exchange is facilitated by research stations, governmental institutions, and commercial seed stockists,

contrasting with informal systems, which rely on cultural norms and social relationships ^[16].

The Indian seed industry is the fifth largest seed market in the world, accounting for 4.4% of global seed market ^[17]. The projected demand for rice in the country by 2050 is estimated to be 197.40 MT for a population of 1.65 billion - almost 80% higher than the current demand ^[18]. This may be achieved by enhancing seed and varietal replacement rate ^[19] as quality seed alone contribute for 5-20% higher yield in rice ^[20]. Responsibility for the production and supply of quality seeds lies with actors of seed system as ICAR, State Agricultural Universities, public sector crop based institutes and State Department of Agriculture. Eventhough India has an extensive formal seed structure 65 percent of the farmers continue to use their own saved seed or seed exchanged among them ^[21]. This raises concern about the efficiency and effectiveness of a formal seed system.

The Registered Seed Growers Programme (RSGP) is a part of the formal rice seed system of Kerala state under the Department of Agriculture and Farmers Welfare implemented by Kerala State Seed Development Authority (KSSDA), since 2001-02. The programme is designed to increase the seed replacement ratio and timely supply of quality seeds to farmers through the production of certified seeds with registered seed growers ^[22]. Farmers either a part of paddy clusters known as Padasekharams or individually engage in rice seed production under the scheme. Seed

growers have to adhere the seed production standards and practice scientific cultivation in the field. Regular monitoring and seed testing procedures are conducted by the officials of the State Department of Agriculture and KSSDA. The seed growers programme in Kerala, which has been an extended efforts for the last two decade also remarks the inconsistency of farmers in the recent years. Additionally, the fund allocation and crop acreage have remained stagnant for the last three years. In this context analyzing the constraints helps not only farmers but also policy makers for formulating effective strategies to improve the programme.

Materials and Methods

Constraints in the study were operationally defined as the forces that impede the effective participation and productivity of farmers in seed production under RSGP. Constraints analysed in the study are classified under socioeconomic, technical, environmental and institutional dimensions.

The study was conducted in the Palakkad district of Kerala, the most extensive area for seed production under RSGP. The two blocks from the district, Kuzhalmannam and Kollengode, were purposively selected based on the highest area under seed production during the period 2022-23. A randomly selected sample of 150 farmers, continuously engaged in seed production for a minimum period of five years either practicing in padasekharams or individually, served as the primary data source for the study. Focus Group Discussion (FGD) was primarily employed to facilitate an interactive dialogue among participants with comparable backgrounds and experiences [23, 24]. Fifteen RSGP farmer representatives selected in consultation with the officials of the Department of Agriculture of Palakkad district actively participated in the FDG for identifying potential constraints. Participants were assigned to prepare an inventory of constraints and ranked them in the order of severity, i.e. the problem needed immediate action, giving the highest rank and the least concerned problem, giving the lowest rank. Furthermore the constraints were finalized and categorized into dimensions after obtaining expert opinions from the extension professionals, researchers and reviewing the available literature.

A total of 28 constraint statements were included in the final list under four dimensions socio-economic (10), technical (6), environmental (5), and institutional (7). A Pretested structured interview protocol was used to explore the constraints under each dimension and ranked in order of severity based on experiences.

The Rank-Based Quotient (RBQ) method proposed by [25] was executed to determine the relative significance of the

constraints. The RBQ approach enabled the derivation of conclusive findings on the most and least critical constraints farmers face [25].

The RBQ formula is:

$$\sum \frac{f_i(n+1-i)}{Nn} \times 100$$

Where,

f_i = Frequency of respondents for i th rank

N = Number of respondents

n = Number of ranks

$\sum$ = it directs to sum multiple factors.

$$\sum = F_1 \times n + F_2 \times n - 1 + F_3 \times$$

$$n - 2 \dots \dots \dots F_n \times 1$$

Appropriate ranks were given based on the RBQ value.

Results and Discussions

Palakkad covers more than 75 percent of the rice seed production area under RSGP. The sample data revealed that farmers under RSGP were mostly in the age group 60-70 with an average of 20 years of experience in seed production. Among the 150 farmers 120 farmers were practicing in padasekharams and remaining do individually. The average seed production area was 1.2 Ha and seed productivity per hectare was recorded as 5 tons/ha. Farmer rank responses on major constraints under different dimensions are categorized and discussed here.

Farmer constraints in socio-economic dimensions

The socioeconomic dimension identified delay in procurement as the prime constraint faced by the farmers under the scheme, with an RBQ value of 94.068 (Table 1). As per the scheme guidelines, the approximate time taken for procurement is 40 days, including 30 days for seed testing after receiving the seed sample and 10 days for issuing the tag following the test results. However, the farmers experienced a time lag of 3-5 months in procurement. The delay was primarily due to a lag in field inspection and seed sampling by the seed inspectors, followed by the delay for seed testing at seed labs and issuance of tags from the state Directorate of Agriculture of Kerala. Farmers reported the role overload of the agricultural officials [26] might be the reason behind the delay and back log of pending tasks and slower process in seed sampling, testing and tag issue in RSGP. The delay in seed procurement affects the timely payment of seed price to farmers. Farmers reported the delay as the second most highly ranked constraint with RBQ value of 78.591. Sadvi *et al.*, (2016) [27] also reported the issue of late payment (80.00%) for hybrid rice seed growers in Karimnagar district of Telangana state.

Table 1: Rank based quotient of socio-economic constraints of farmers

Sl. No	Socio-economic constraints	RBQ	Rank
1	Delay in seed procurement	94.07	I
2	Delay in payment of seed prices	78.59	II
3	Procurement price has not been adjusted for many years	74.10	III
4	Higher labour cost due to stringent seed standards	68.74	IV
5	Higher cost of farm inputs in seed production	62.38	V
6	Scheme provision is insufficient to cover the current loading and unloading charges	52.53	VI
7	Inadequate government incentives to promote RSGP groups	40.67	VII
8	Financial allowances have not been provided for rented storage facilities	37.18	VIII
9	Inadequate subsidies for the purchase of machineries under the scheme	24.05	IX
10	Lack of group insurances for Padasekharams under the scheme	20.43	X

Eventhough seed (Rs 38/Kg) is procured at a higher price compared to grain (Rs 28/Kg), seed production incurs higher costs due to the specialized practices required to attain seed standards [28]. It was quiet disappointing to record tha the procurement price has not been adjusted for the last 3 years (74.102). This was ranked as third constraint. Skilled labour charges incurred for specific practices such as roughing, drying, facilitating storage conditions etc along with the prevailing higher wages in the state are the added factors contributing to the higher cost of seed production. As a result farmers encountered challenges to make seed production profitable.

State Department of Agriculture has to take proactive steps to guarantee timely procurement and payment to promote efficient engagement of farmers in the programme. Increasing the number of officials and technical teams to collaborate with seed inspectors would ensure timely inspection and sampling. Government should also anticipate budget provisions and commit timely payment as timeliness of payment is a major factor in farmers' decision to sell [29]. Eliminating payment delay has been shown to improve both productivity and profitability [30] of farmers. Moreover, it would be beneficial to explore the possibilities of skilled

labour pool under LSGs and enhancing the input subsidies to reduce the cost of production.

Farmer constraints in technical dimension

As seed production involves skilled labour the trained farmer would maintain genetic purity, isolation distance, vigorous roguing and appropriate stage of harvesting [31]. However conventional farm labourers and migrant labourers carry out the practices of seed production without any proper trainings. Additionally, if farmers lack the knowledge to guide the activities, it would negatively affect the seed quality. Hence the technical constraint of shortage of skilled labour (79.705), ranked as first (Table 2) is found to be significant and strategies are required immediately to address the issue. Hybrid rice seed growers in Telangana have also revealed the lack of skilled workforce as their major constraint [27].

Farmers expressed concerns about the quality of foundation Seed II (FS II) supplied for multiplication and ranked as the second severe constraint (73.435). They had significant crop losses due to the poor germination rates and incidence of undesirable varieties in foundation seeds distributed from State seed farms during certain seasons.

Table 2: Rank based quotient of technical constraints of farmers

Sl. No.	Technical constraints	RBQ	Rank
1	Shortage of skilled labour to perform requisites of seed production	79.70	I
2	Foundation seed supplied for cultivation are of inadequate quality	73.43	II
3	Seeds of climate resilient rice varieties are not supplied for multiplication	53.67	III
4	Farmer varietal preferences are not considered under RSGP	46.83	IV
5	Quality of certified seeds deteriorates due to inadequate storage facilities	43.51	V
6	Training on seed production is inadequate	31.82	VI

Uma and Jyothi are the common rice varieties supplied for multiplication. Farmers were interested in cultivating climate resilient varieties (53.675) and were willing for a varietal replacement (46.835). Their dissatisfaction was ranked as third and fourth in priority. Farmers continue seed storage in traditional facilities during the lag in procurement, which raises concerns about seed quality and issues of integrity in certified seeds. Furthermore, it creates respirational and other health problems due to the long storage of grains in their house premises. Though scheme agenda emphasis periodic trainings for the registered growers, farmers reported as they merely obtain training and exposure visits (31.825).

Constraints under technical dimensions can be addressed by designing skill based programmes in Krishi Vigyan Kendras and SAMETI for the labour force engaged in RSGP, adequate interventions of state seed farms for providing high quality foundation seeds, enhancing the financial support for the construction of common storage facilities under the scheme and engaging farmers in the multiplication of newer and climate resilient varieties.

Farmer constraints in environmental dimension

Palakkad district is one of the most drought prone districts in the state [32]. Farmers under RSGP expressed their difficulties due to drought and water stress and ranked first (83.46) under environmental constraints. Farmers have experienced insufficient water availability and uncertain rainfall impacting the quality of seed production. Climatic abnormalities occurring at harvest and during the post-harvest stages severely impact seed yield and reduce the morphological, physiological and biochemical quality, ultimately reducing the field performance and planting value of the seed lot [33].

Wild animal attacks (71.37), common in the state ranked second and farmers raised the issues with stringent policy measures in crop loss insurance making it difficult to obtain coverage for the damages caused by these attacks. Farmers observed the occurrence of storage pests in recent years due to higher temperature fluctuations and erratic rains. The quality reduction due to storage pest was ranked third with RBQ value 56.29

Table 3: Rank based quotient of environmental constraints of farmers

Sl. No.	Environmental constraints	RBQ	Rank
1	Drought or intermittent water stress	83.46	I
2	Wild animal attack damage crop, along with difficulties in availing crop insurances to cover the losses	71.37	II
4	Storage pest attacks degrade the grain quality	56.29	III
5	Lodging issues due to heavy rain and wind	40.82	IV

Farmer constraints in institutional dimension

Analysis of institutional constraints highlights the lack of seed testing labs (87.89), delay in getting tags (85.8), and shortage of seed processing centres (70.07), which are ranked as first, second, and third (Table 4). There is a need for transparency in seed testing procedures. Farmers are to be made aware of the reasons for rejecting the seed lots. The establishment of a seed testing lab in the district might address these challenges and could overcome the delay in seed testing reports.

Under the scheme, the ceiling is made for the procurement as 2 tons/acre with an addition of 0.2 tons/acre based on crop cut valuation. Farmers who produce more than the ceiling

have to find a market for the extra produce. Mostly farmers are forced to sell as grain in local markets. The difficulties in limited procurement (66.025) was ranked as fourth constraint.

The shortage of seed processing centres (70.07) of KSSDA was the third constraint. KSSDA procure, process and grade the seeds based on the quality. If processing centres are at nearby locations, farmers could easily procure back the damaged seeds, husks and remittants of seed processing and reuse as cattle feed. But due to logistic difficulties, even though subsidies are provided for loading and unloading expenses they could not meet transportation charges.

Table 4: Rank based quotient of institutional constraints of farmers

Sl. No.	Institutional constraints	RBQ	Rank
1	There is no seed testing lab in the district	87.89	I
2	Delay in getting seed tag	85.80	II
3	Shortage of seed processing centres	70.07	III
4	Procurement of limited quantity of seed	66.02	IV
5	Improved varieties from the research level are not reaching into the farmer fields	47.41	V
6	There is no facility to remit the registration fees at the Krishi Bhavan.	23.21	VI
7	I can't track the status of my test results and tags	32.12	VII

Conclusion

Agriculture depends significantly on using quality seeds to satiate the ever-increasing food requirement. Still, the threats to the production and supply of good quality seeds have been relatively overlooked, and the study also implies that.

The study investigated the delays in procurement and payment, shortage in skilled labour, inadequate quality of foundation seed, drought, insufficiency in seed testing lab, delay in obtaining seed tag as the important constraints of rice seed farmers in Palakkad district.

Since most of the constraints expressed occur at the post production stages interventions at the institutional level is to be strengthened. Economic constraints have to be overcome with timely procurement, payment, thus ensuring better participation and efficiency of farmers in seed production schemes of the state.

Polymakers, researchers, and stakeholders have to work together to address the challenges of seed growers in the state. Implementing targeted interventions and promoting inclusive, sustainable seed production systems can enhance food security, improve livelihoods, and ensure resilient agriculture for future generations.

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