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Constraints in paddy cultivation faced by the farmers in upper Kuttanad: A study in Alappuzha district of Kerala

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Abstract

Alappuzha holds the second position with respect to area, production and productivity of rice in Kerala. The Kuttand region, where rice farming is practiced below mean sea level is called the "Rice bowl of Kerala". For studying the constraints faced by the farmers in the region a survey was conducted in the upper Kuttand region. The study was based on the primary data collected from 25 each paddy farmers cultivating in salt water affected and unaffected areas from the Haripad block of Alappuzha district of Kerala. Garrett's ranking method was used for the constraint analysis. Weed problem was the major constraint faced by most of the farmers from the salt water unaffected areas followed by the scarcity of hired labour. In the case of salt water affected farmers, the major constraint was the salt water intrusion, followed by decrease in quality of paddy due to salinity.

Keywords: Constraints, current status, Garrett's ranking, salt water intrusion

1. Introduction

Rice is one of the major crop grown extensively and standing as a staple food for around 70 per cent of the world population. About 19 per cent of global per capita energy and 13 per cent of per capita protein was provided by rice solely. India ranks first in area (437.89 lakh hectare) and second in production (112.91 million tonnes) with majority of people depending on rice for their daily calories (GOI- Annual Report, 2019) [4].

Rice is cultivated in a wide range of ecosystems and water regimes in Kerala. Pokkali, Kuttand, Kaipad and Kole areas are the special rice farming ecosystems in the state. Kuttand area is famous all over the world as below sea level farming is practiced here. About 25 per cent of total rice production in Kerala was under water logged conditions, particularly in Kaipad, Kuttanad, Pokkali and Kole regions (Joseph, 2008; Jayan and Sathyanathan, 2010) [6]. In Kerala, Alappuzha holds the second rank with respect to area (38,623 ha), production (1,28,560 tonnes) and productivity (3041.18 kg/ha) of rice next to Palakkad. The Kuttand region falls in Alappuzha and Kottayam districts. The region even though is blessed with luxurious paddy fields, the intrusion of salt water is one of the major constraints faced by the farmers. Hydromorphic saline soils are found near the coastal tracts of the state in the districts of Ernakulam, Alappuzha, Thrissur and Kannur. The network of estuaries and backwaters oblige as inlets for tidal waters to flow inland in to these areas causing salinity (Chandramohan and Mohanan, 2012) [2]. Therefore, the present study was conducted to assess the major constraints faced by the salt water affected and the unaffected rice farmers in Alappuzha district of Kerala in order to derive solutions to improve the productivity of rice and socioeconomic status of farmers.

2. Methodology**2.1 Sampling and data collection**

The study was conducted in Haripad block (Upper Kuttanad) of Alappuzha district. Haripad was purposively selected for the study since salt water intrusion in to the paddy fields were frequently being reported in the area. The study was focused mainly on primary data, collected from 50 paddy farmers *viz*, 25 paddy farmers cultivating in salt water affected area and 25 paddy farmers from salt water unaffected area. Method of sampling adopted was simple random sampling. The detailed assessment and interpretation of constraints faced by rice farmers were required to find solutions to improve the productivity, farm income and also to find policy implications.

In order to analyse the constraints faced by paddy farmers in salt water unaffected and affected areas, Henry Garrett's ranking technique was used. This technique helps in converting the changes of orders of constraints in to numerical scores (Zalkuwi *et al.*, 2015) [10]. Several constraints were noted and enlisted in tabular form based on prevailing conditions in the selected area. During the survey, respondents were requested to rank the constraints without any bias. The obtained ranks were then converted to the per cent position by using the formula shown below.

$$\text{Per cent position} = \frac{100 \times (R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for the i^{th} factor by j^{th} person.

N_j = No. of constraints ranked by the j^{th} person.

(Garrett and Woodworth, 1969) [3]

Using Garrett's conversion table, the calculated per cent positions were converted to Garrett score. The sum and mean value of Garrett scores were worked out from the scores attributed to each constraint by the individual respondents. Mean score obtained for each constraints were arranged in the ascending order and the constraint with the maximum mean score was identified as the serious problem faced by the paddy farmers in selected area.

3. Results and Discussion

3.1 Constraints faced by the paddy farmers in the salt water unaffected area

A lot of constraints were being faced by the farmers cultivating paddy in the salt water unaffected area of Haripad block. Farmers from the salt water unaffected areas of Haripad, Pallipad and Kumarapuram villages were surveyed for obtaining information. Detailed assessment and interpretation of the constraints was required to improve the productivity, income and thereby livelihood of the farmers. A total of 19 general constraints of paddy cultivation were enlisted and the farmers were asked to rank based on its severity. From which the most important 10 constraints ranked by majority of farmers were tabulated and presented in table 1. And the constraint analysis was done using Garrett's ranking method.

The results revealed that weed problem was the most severe constraint faced by most of the farmers with a garret's score of 95.68 followed by the non-availability of hired labour having a score of 65.72. The next major problem was the increased cost of inputs (63.08) and followed by pest related problems (62.16). Apart from this, the climatic constraints such as uneven distribution of rainfall affected the paddy farmers with a Garret's score of 59.84. Subsequently, problems related to harvesting, such as non-availability of

harvester in time, extra losses and difficulties faced during the delayed harvesting came in sixth position with a Garrett's score of 56.52. Micronutrient deficiencies (55.80) and delay in disbursing the price of procured paddy (53.80) were also prominent among paddy farmers.

Table 1: Constraints faced by paddy farmers in the salt water unaffected area

Sl. No	Constraints	Garrett's score	Rank
1	Weed problem	95.68	1
2	Availability of hired labour in time	65.72	2
3	High cost of inputs	63.08	3
4	Pest problems	62.16	4
5	Uneven distribution of rainfall	59.84	5
6	Problems related to harvesting	56.52	6
7	Micronutrient deficiencies	55.80	7
8	Delay in disbursing the price of paddy procured	53.80	8
9	Attack of birds and rodents	51.48	9
10	Construction and maintenance of bunds	50.88	10

3.2 Constraints faced by paddy farmers in the salt water affected area

The paddy farmers in the salt water affected area of Haripad block were facing a number of constraints and were given in table 2. Farmers were surveyed from the Veeyapuram and Cheruthana villages of Haripad block. The major constraint was the salt water intrusion with a Garrett's score of 77.68. This affected the productivity as well as average returns from rice. According to the farmers, major reason for salt water intrusion in to rice fields was due to the improper construction and maintenance of bunds by the Irrigation department. The farmers also pointed out that there is lack of co-ordination by the Irrigation department and other line departments in taking necessary precautionary actions against salt water intrusion. As a result of the floods in 2018 in Kerala, three shutters of Thottapally spillway were damaged and repair work is still underway. It also resulted in inadequate and inefficient management of salt water intrusion into the region. The next major constraint pointed out by the farmers was decrease in quality of produce due to salinity (71.36). Based on the quality and moisture content of produce, a certain amount for paddy was reduced from the total procured paddy (*Kizhivu*). This reduction was solely made by the rice mills and it often lead to conflicts between rice mill agents and farmers (69.04). The other major constraints included weed problems (66.48), availability of hired labour in time (62.20), high cost of inputs (59.00), pest problems (56.56), delay in disbursing the price of paddy procured (56.40) and uneven distribution of rainfall (45.08). Micronutrient deficiencies (44.64) were also affecting the paddy farmers by making their livelihood in distress.

Table 2: Constraints faced by paddy farmers in the salt water affected area

Sl No.	Constraints	Garrett's score	Rank
1	Salt water intrusion	77.68	1
2	Decrease in quality of paddy due to salinity	71.36	2
3	Conflicts between rice mill agents and farmers in determination of Kizhivu	69.04	3
4	Weed problem	66.48	4
5	Availability of hired labour in time	62.20	5
6	High cost of inputs	59.00	6
7	Pest problems	56.56	7
8	Delay in disbursing the price of paddy procured	56.40	8
9	Uneven distribution of rainfall	45.08	9
10	Micronutrient deficiencies	44.64	10

Similar study conducted by various researchers revealed the main problems of paddy cultivation included a reduction in number of full time farmers, marginal and small scale land holdings, high rate of crop failure, lack of availability of farm hands for harvesting, growing aversion in the new generation on rice cultivation and the higher land value offered by the real estate people often brainwashing the farmers to sell their waterlogged fields. (Thomas, 2002; Suchitra and Venugopal 2005; Basheer, 2008) ^[9, 8, 1]

3.3 Perception of farmers on the status of rice farming in Haripad block

The data pertaining to the perception of farmers on current status of rice farming in Haripad block over the past 10 years were given in Table 3. Majority of the respondents (52.0%) expressed that, there was no change in the area under rice cultivation and about 38 per cent of the respondents stated a slight increase in the area. About 66 per cent of the sample respondents expressed high large increase in the cost of cultivation. This was mainly due to the increased wage rates of labourers and prices of inputs. No change in the yield was expressed by 52 per cent of the sample farmers, whereas 20 per cent of the respondents expressed slight increase in the yield. This was due to the increased usage of machines and implements as well as high yielding varieties of rice. Nearly 66 per cent of the farmers expressed over the years there has been in the procurement price of rice. The increase is due to price policies followed by central and state governments. In addition to the minimum support price the state government is paying state incentive bonus in order to help the farmers. More than half of the respondents vented a slight reduction in

labour availability. The labour wages per day as expressed by the sample farmers were also increased in the area. High wage rate is a common feature in the state. Sixty per cent of the respondents perceived that the difficulty in getting good quality seeds is getting reduced over the years.

About half of the total respondents expressed that the emergence of new weed varieties is posing problems. The continuous application of same herbicides without rotation may be the reason for emergence of new weeds. Some of the farmers opined that new weeds mainly entered the fields through the seeds they procured from outside districts. Application of micro nutrients and soil test based fertilizer recommendation increased mainly due to the increased awareness about their importance in farming. Mechanisation and general interest in rice farming had also increased. This was due to the welfare schemes implemented by the government to the paddy farmers. But the involvement of younger generation in paddy farming decreased due to their lack of interest in farming and tendency in acquiring white collar jobs.

The sample farmers also expressed slight increase in the adoption of mitigation strategies followed for salt water intrusion. A study conducted by M. S. Swaminathan Research Foundation (MSSRF) (2007) evaluated the measures to mitigate agrarian distress in Alappuzha and Kuttanad wetland ecosystem. *Orumuttu* or temporary salt exclusion barriers were constructed to prevent the salinity intrusion from sea to Kuttanad through major and minor inlets. Even though, it was costly and inefficient for the timely prevention of salinity. But now the construction expenses for *Orumuttu* was solely undertaken by the state irrigation department.

Table 3: Distribution of sample farmers according to their view on current status of rice farming compared to past 10 years

S No	Particular	No change	Slightly increased	Highly increased	Slightly decreased	Highly decreased
1.	Area under rice cultivation	26 (52.0)	19 (38.0)	5 (10.0)	0 (0.0)	0 (0.0)
2.	Cost of cultivation/ acre (in Rs.)	0 (0.0)	17 (34.0)	33 (66.0)	0 (0.0)	0 (0.0)
3.	Yield/acre (in Kg)	26 (52.0)	10 (20.0)	0 (0.0)	10 (20.0)	4 (8.0)
4.	Procurement price of rice (in Rs.)	0 (0.0)	17 (34.0)	33 (66.0)	0 (0.0)	0 (0.0)
5.	Labour availability	5 (10.0)	5 (10.0)	0 (0.0)	35 (70.0)	5 (10.0)
6.	Availability of seeds	4 (8.0)	30 (60.0)	16 (32.0)	0 (0.0)	0 (0.0)
7.	Emergence of new weeds	17 (34.0)	28 (56.0)	0 (0.0)	5 (10.0)	0 (0.0)
8.	Micro nutrient application	0 (0.0)	38 (76.0)	12 (24.0)	0 (0.0)	0 (0.0)
9.	Soil test based fertilizer recommendations	0 (0.0)	34 (68.0)	16 (32.0)	0 (0.0)	0 (0.0)
10.	Mechanization	0 (0.0)	11 (22.0)	39 (78.0)	0 (0.0)	0 (0.0)
11.	Interest of farmers in paddy farming	5 (10.0)	33 (66.0)	8 (16.0)	4 (8.0)	0 (0.0)
12.	Involvement of younger generation in paddy farming	0 (0.0)	2 (4.0)	0 (0.0)	17 (34.0)	31 (62.0)
13.	Use of adaptation / mitigation measures for salt water intrusion	0 (0.0)	33 (66)	17 (34.0)	0 (0.0)	0 (0.0)

Note: Figures in brackets denote percentage to row total

4. Conclusions and policy implications

Garrett's ranking method was used for the constraint analysis. Weed problem was the severe constraint faced by most of the farmers from salt water unaffected areas. In the case of salt

water affected farmers, the major constraint was the salt water intrusion itself. Followed by decrease in quality of produce due to salinity. According to the farmers, major reason for salt water intrusion into rice fields was the improper construction

and maintenance of bunds. Majority of the farmers perceived that, there was a high increase in cost of cultivation, usage of machines, market price of paddy, availability of seeds, labour wages, emergence of new weeds and use of adaptation or mitigation strategies for preventing salt water intrusion in Haripad over the past ten years. Timely construction and proper maintenance of bunds are the most efficient measures to prevent salt water intrusion to the farmer's fields. Opening and closing of Thottapally spillway and Thannermukkom bund has a major role in maintaining the salt water intrusion. The conflicting needs by paddy farmers and fish farmers in the case of operation of bunds needs to be addressed properly. Institutional measures may be made more effective which is the most important factor to address this issue. If the issues faced by the farmers are properly addressed the paddy farming in Kuttand can be made more profitable.

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