

Challenges and Constraints for Seed Paddy Farmers: A Case Study of the Ampara District, Sri Lanka

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Abstract- The study investigated the problems faced by seed paddy farmers. The survey was conducted by taking a total of 120 seed paddy producing farmers between September 2020 to December 2020 at Akkaraipattu, Addalaichenai and Alayadivembu Divisional Secretariats (DS) areas in Ampara district. Respondent were selected based on the stratified sampling technique and randomly interviewed directly by preparing a semi-structured questionnaire. The results indicated that more than half of the seed paddy farmers faced labour shortage during the harvest (53.4%) where as 48.3% of them affected by the lack of seed paddy for their cultivation. The cost for controlling the weed, pest and diseases was higher compared to other activities (40%) where as 70% of the seed paddy farmers were facing difficulties to get cleaned seed while only 5% of their lost the seed germination due to combine harvester. We concluded that the major problems faced by the seed paddy farmers were labour shortage, cultivation, management practices and harvesting problems. Therefore, this study suggests that most of the youngsters and educators should be motivated and trained about the seed paddy farming through extension services. Further, seed agencies should expand their distribution networks to ensure that quality seed is available to farmers quickly and easily in this surveyed area.

Keywords: Ampara district, constraints, high-quality seeds, seed paddy farmers.

I. INTRODUCTION

Rice is Sri Lanka's most important crop, accounting for 40 per cent of the total cultivated area and serving as the country's staple food (USDA, 2020). Paddy crops are grown as wetland crops in every district. Around 1.8 million farm families practice paddy cultivation throughout the island. The extent of cultivation of paddy is 800,000 ha, the largest extent devoted to a single crop in Sri Lanka. Over 700,000 ha are planted in

the Maha season and another 450,000 ha in the Yala. The national annual production of rough rice is 2.7 million tons, and it satisfies around 95 per cent of the domestic demand (DOA, 2019). The cost of production of seed paddy for the most productive regions in the country during Maha season around Rs. 73.00/kg for irrigated land and Rs. 63.00/kg for rain-fed areas (SEPC, 2019). There is a need for substantial increases in land and labour productivity to improve competitiveness against potential imports. Production of paddy is favoured in agricultural policy: the government gives support through land, free irrigation water, fertilizer subsidies, and price supports (USDA, 2020).

Seed quality is a key factor in rice production. It must be grown, harvested, processed, and stored correctly for the best yield and excellent results. Almost every farmer is aware of the need for good seed and its contribution to higher yields. Thus invariably, farmers attempt to obtain the best seed available within their capabilities. The average annual requirement of seed paddy is 130,000 MT which is sufficient to plant approximately 1 million hectares (NASTECH, 2019). There are mainly three seed supply systems distributing paddy seeds to the farmers. Around 15% of farmers' seed requirement is supplied through a formal seed supply system which is assured for its genetic and physical purities and germination capabilities. Another 35% of seed is supplied by private seed producers, who purchase basic seed from Department of Agriculture (DOA). The informal system supplies balance 50%, which is the majority of farmers use rice seed produced by themselves from their previous crop or borrow from neighbouring farmers and self-seed program organized by extension officers (Senevirathna *et al.*, 2008). Although the targeted amount of seeds produced by DOA is around 25% of the national seed requirement, only 15% is being supplied.

The country's lack of seed processing capability was one of the major constraints to promoting high-quality rice seed production. Many private enterprises and farmers who came forward to produce rice seeds could not afford high-quality seed processing machinery and storage structures (Weerasena & Madawanarachchi, 2000).

Although the DOA gives support to those informal seed producers to increase the seed processing capacity by giving them imported medium-scale machinery, still gaps are prevailing within village level farmers to make use of the best paddy seeds. Therefore, this study was mainly focused on the problems faced by seed paddy farmers in some of the selected DS (Akkaraipattu, Addalaichenai and Alayadivembu) divisions in Ampara district.

II. LITERATURE REVIEW

In rice yield improvement, the supply of quality seeds will be of prime concern (Gunasena, 2004). The annual rice seed requirement of Sri Lanka approximates 1 million tons. The state farm was unsuccessful in supplying the required amount in the past for various reasons hence, the government intervened to expand Certified Seed Paddy (CSP) producers. Farmers usually obtain their paddy seeds from government farms, which are operated by the DOA). The DOA also produces paddy seeds through contract growers (out-growers). Since the capacity of government farms to meet the demand of all farming communities is limited, and since the areas in the north and east of Sri Lanka lack quality seeds for many years and DOA promotes seed paddy out-growing (FAO, 2018).

The general farm producer retained for seed cannot be substituted for quality seed as it generally lacks genetic vigour and has poor germination. One reason for the low replacement of certified seed could be its high price and non-availability at the proper place in time. It is particularly true in small farmers who generally have low availability of cash (Singh *et al.*, 1990). Many factors influence the cost of cultivation. Input price, labour consumption and fluctuating wage rate during harvesting season, cost of hired machinery, land tenure and availability of capital on time are important factors. In case farmers are obtaining capital for farm inputs with delay, they are missing the suitable time for sowing. Consequently, this affects the cost of production and the yield, which in many instances coincides with the seasonal outbreak of diseases (Kahan, 2008).

The DOA can fulfil about 3% of the national seed paddy requirement while the balance is met by paddy farmers, farmer's organization, co-operatives and private companies. Only a part of the seed paddy production of these institutions had been certified by the DOA (Central Bank, 1997). In 2018, Agriculture accounted for 7.87% of the gross domestic production (GDP) in Sri Lanka, which 0.7% contributed by rice. However, in 2010 which accounts for 1.8% of the total GDP (Plecher, 2019). When looking at the last couple of years (2011-2017) which is gradually decreasing trend as 1.5%, 1.4%, 1.6%, 1.2%, 0.9%, 0.6%, 0.5% respectively (Economic and Social Statistics of Sri Lanka, 2019). This emphasizes the need of upgrading the rice sector in Sri Lanka using appropriate technologies.

The National Seed Policy (NSP) of Sri Lanka was officially declared in 1997. The guideline has been provided to encourage private sector participation in producing the country's requirement of quality seed and planting material. In November 1997, the government announced in the 1998 budget, various measures that would be taken to make available an inadequate quantity of quality seed material. In seed paddy, in the 5 major rice-producing districts (Ampara, Anuradhapura, Polonnaruwa, Kurunagala and Hambantota) five acres of seed paddy among paddy farmers are to be developed to increase the seed production. The DOA expected to enhance, its extension service by a mobile agricultural technology service in these 5 districts to improve field-level testing, fertilizer application and use of quality seed that would result in increased yields (Central Bank, 1997).

III. METHODOLOGY

The survey was conducted by taking a total of 120 seed paddy producing farmers between September 2020 to December 2020 to collect the data from Akkaraipattu, Addalaichenai and Alayadivembu DS division in the Ampara district. Respondents were selected based on the stratified sampling technique. Thus, 60, 36, and 24 seed paddy farmers correspondingly from Akkaraipattu, Addalaichenai and Alayadivembu were randomly interviewed directly by preparing a semi-structured questionnaire. Farmers were inquired about their socio-economic characteristics, cultivation practices, cost components, and major constraints faced for seed production. Collected data were analyzed by statistical package for social science (SPSS) version 25.0.

IV. RESULTS AND DISCUSSION

A. *Socio-Economic Characters of Seed Producer*

On average, the farmers involved in seed paddy production were 50 years old with an average family size of four. Further, the average level of education was 10 years of schooling. However, some farmers were well educated, having a degree or diploma, and they had 19 years of mean farming experience. Income from farming through Maha and Yala was Rs 198,830.00 per annum, and the average monthly household income from other income sources was Rs 39,560.00. (Table 01).

Table 01: Socio-Economic Characteristics of Respondents

Attributes	Mean \pm SE
Age (Years)	49.80 \pm 1.08
Education level (Years of schooling)	9.83 \pm 0.31
Farming income (Rs/Season)	198,830 \pm 11946.65
Monthly household income (Rs/Month)	39,560 \pm 1192.30
Farming experience (Years)	18.55 \pm 1.14
Family size (Nos)	4.28 \pm 0.11

Source: Field Survey Data, 2020

B. *Extent and Land Ownership of Certified Seed Producers*

The land is the main capital invested by a farmer to produce seed paddy. The average extent of paddy cultivation was 14.54 acres, while the average extent of seed paddy cultivation was 4.49 acres per seasons by a farmer (Table 02). Most of

the seed paddy farmers in this region had their land (93.8 %). This reveals that the farmers cultivated in tenant land are not interested in seed paddy production as they need to expend additional money to provide a lease for the land.

C. *Source of Irrigation Water of Seed Paddy Production*

The cultivation practices of seed paddy production were very intensive compare to regular paddy cultivation. The majority of the farmers (92.7%) in all 3 DS areas were used water from irrigation channels, whereas only a few of them used other water sources, as indicated in Table 03. The quality of seed paddy produced was mainly impacted by agronomic practices (Tilman *et al.*, 2002).

D. *Ownership of Machinery*

The 4-wheel tractors, water pumps and combine harvesters are the most prominent machinery used for paddy production in the Eastern part of Sri Lanka since the paddy plots are relatively bigger compared to other regions. All the farmers used four-wheel tractors for ploughing purpose. Among them, only 25.57% of farmers were having own tractors (Table 04). About half of the sample farmers did not have a water pump as their paddy field had irrigation facilities were available at a sufficient level. In this area, used combine harvester for harvesting, while an average of 19.96% of farmers had their combine harvester. In the Alayadivembu DS area majority of the farmers (28.9%) owned combine harvester, and ownership of 4-wheel tractor was higher in the Addalaichenai DS area (30.2%).

Table 02: Extent and Land Ownership

Land Extent and Ownership	DS divisions			
	Akkaraipattu (n = 60)	Alayadivembu (n = 36)	Addalaichenai (n = 24)	Average (N = 120)
Extent of normal paddy (acre/person/season)	14.18 \pm 1.32	18.00 \pm 3.18	10.13 \pm 1.73	14.54 \pm 1.25
Extent of seed paddy (acre/person/season)	4.28 \pm 0.33	5.53 \pm 1.17	3.29 \pm 0.33	4.49 \pm 0.39
Owned land (%)	92.7	91.4	97.3	93.8
Tenant land (%)	7.3	8.6	2.7	6.2

Source: Field Survey Data, 2020; Values are Mean \pm Standard Error

Table 03: Source of Irrigation Water (% of Farmers Responding)

Irrigation sources	DS divisions			
	Akkaraipattu (n = 60)	Alayadivembu (n = 36)	Addalaichenai (n = 24)	Average (N = 120)
Irrigation Channel	92.4	94.4	91.4	92.7
River	3.2	5.6	0.0	2.93
Tank	3.2	0.0	4.3	2.5
Agro wells	1.2	0.0	4.3	1.83

Source: Field Survey Data, 2020

Table 04: Ownership of Implements (% of Farmers Responding)

Implements owned	DS divisions			
	Akkaraipattu (n = 60)	Alayadivembu (n = 36)	Addalaichenai (n = 24)	Average (N = 120)
4 Wheel tractors	28.7	17.8	30.2	25.57
Water pumps	51.1	53.3	59.0	54.47
Combine harvesters	20.2	28.9	10.8	19.96

Source: Field Survey Data, 2020

E. Cost of Hired Implements

The farmers who did not have their machinery used hired machinery for cultivation activities. According to the data, the highest portion of machinery hiring cost was allocated to combine harvester this result is supported by Mufeeth *et al.* (2019). The hiring cost of the combined harvester was higher (Rs. 9,173.70/acre) in the Akkaraipattu DS area (Table 05) than other DS areas since the extent of muddy rice lands higher compare to other regions therefore, the farmers have to hire

crawler type harvester which is expansive than tyre type. The cost of hiring the four-wheel tractor was higher (Rs. 6,815.40/acre) in the Alayadivembu DS area, where the plot size of rice is relatively smaller therefore, the drivers found it difficult to plough the land continuously. Further, the highest cost of hiring a water pump was observed in the Addalaichenai DS area (Rs. 970/acre) where the larger extent of paddy land become dry due to the unavailability of irrigation water during the Yala season.

Table 05: Cost for Hired Implements (Rs/Acre)

Implements hired	DS divisions			
	Akkaraipattu (n = 60)	Alayadivembu (n = 36)	Addalaichenai (n = 24)	Average (N = 120)
4 wheel tractors	6,620.70	6,815.40	6,812.8	6,780.00
Water pumps	968.18	966.67	1,100.00	970.00
Combine harvesters	9,173.70	8,772.70	8,800.00	8,988.6

Source: Field Survey Data, 2020

F. Major Challenges and Constraints Faced by the Seed Paddy Farmers

Labour shortage is a severe problem in these areas. Seed paddy cultivation requires hired male and female labour for sowing, weeding, harvesting, fertilizer and pesticide application. The hired labour obtained from the same villages or adjacent villages. The cost of hired labour varied from Rs 1,200.00 to Rs 1,500.00 per day. The seed paddy plot should be maintained as weed-free for every field inspection period. Therefore, during this period and harvesting period, labour shortage was higher. Around 97% of farmers stated that the labour shortage was affected their cultivation (Table 06). More than half of the seed paddy farmers faced labour shortage problem during the harvesting period.

Table 06: Period of Labour Shortage (% of Farmers Responding)

Challenges	Percentage
Labour shortage based on the period	
Beginning of cultivation	32.8
During cultivation	12.1
At the harvest time	1.7
Harvesting period	53.4
Cultivation problem	
Lack of seed paddy	48.3
Low seed quality	13.7
High cost of seed paddy	6.7
Unavailability of required seed paddy varieties	31.3
Management practices problem	
Control of weed, pest and disease	40.0
High labour requirement	10.0
Water shortage	34.2
Need different weedicide	15.8
Harvesting problem	
Loss of germination	5
More seed damage occur	25
Seed not cleaned well	70

Source: Field Survey Data, 2020

The quality of certified seed paddy (CSP) production mainly depends on the good quality planting material, but farmers face some difficulties in obtaining CSP from the DOA. Most

of the farmers affected due to lack of seed paddy for their cultivation (48.3%) while, 31.3% of them cannot get the required seed paddy varieties in the Department of Agriculture, some of them (13.7%) of them got poor quality of seed paddy and few of them (6.7%) affected due to the high cost involved in obtaining seed paddy (Table 06).

Profit of seed paddy production mainly depends on the management practice expenditure. Seed paddy producers have commonly faced the cost of controlling weed, pest and diseases. The majority of the seed paddy farmers (40%) were faced with the higher cost involved in controlling the weed, pest and diseases (Table 06). while 34.2% of the farmers were affected by the shortage of required water during the chemical application, 15.8% of the farmers were required different weedicides to control and only 10% of the farmers affected by higher labour requirement.

Thus, control of weed and pest are the severe constraint among the seed paddy producers. Most of the farmers were using combine harvester for harvesting. The combine harvester caused mechanical damage to the seed during harvesting, which will affect the seed quality. In this surveyed area, most of the farmers were affected by this problem. Impacts due to the usage of combine harvester were loss of germination, seed damage and seed not cleaned well. 70% of the farmers were facing difficulties to get purely cleaned seed while 20% of them got damaged seeds and only 5% of their lost the seed germination due to combine harvester during harvesting (Table 06).

V. CONCLUSION

The survey study found the most of the farmers involved in seed paddy farming were old with lower level of education. The major challenges and constraints faced by the seed paddy farmers were labour shortage during the harvesting period, cultivation, management practices and harvesting problems. In this surveyed area, lack of seed paddy, low seed quality, high cost of seed paddy and unavailability of required seed paddy varieties were the major cultivation problems. Control of weed, pest and disease, water shortage, required different types of weedicide were the prominent crop management problems faced by seed paddy farmers. Therefore, this study suggests that most of the youngsters should be motivated and trained to involve in seed paddy farming through extension services, and seed agencies should expand their distribution networks to ensure that

quality seed is available to farmers quickly and easily in this surveyed area.

REFERENCES

Central Bank of Sri Lanka, (2016) Economic and social statistics of Sri Lanka 2016.

Department of Agriculture. (2019) Rice cultivation. Available at: https://doa.gov.lk/rrdi/index.php?option=com_sppage_builder&view=page&id=42&lang=en. (Accessed: 15 April 2021).

FAO. (2018) "Country Gender Assessment of Agriculture and the Rural Sector in Sri Lanka". Food and Agriculture Organization of the United Nations, Colombo, 80 pp.

Gunasena, H. P. M. (2005) "Research needs assessment and prioritization of agricultural research for development: Sri Lanka". Research Need Assessment and Agricultural Research Priorities for South and West Asia.

Kahan, D. (2008). *Managing risk in farming*. Food and Agriculture Organization of the United Nations, Rome.

Mufeeth, M., Nusrathali, N. and Majeed, U. L. A. (2019) "Cost and benefits, marketing and profitability factors of registered seed Paddy farmers". SEUSL Journal of Marketing, 4(2), pp.1-10.

National Science and Technology Commission. (2019) Performance review of the seed certification service of the Department of Agriculture, pp. 1–73. Available at: http://www.nastec.gov.lk/files/review_report/Performance_Review_SCS_Final. (Accessed: 10 April 2021).

Plecher, H. (2019) Share of Economic Sectors in the Gross Domestic Product (GDP) from 2008 to 2018. Available at: <https://www.statista.com/statistics/728539/share-of-economic-sectors-in-the-gdp-in-sri-lanka/>. (Accessed: 05 May 2021).

Senevirathna, J. G. D. T., Mettananda, K. A. and Bogahawatta, S. (2008) "A study on the present status of seed paddy production in Sri Lanka". Annals of the Sri Lanka Department of Agriculture, 10, pp.177-189.

Singh, G., Asokan, S. R. and Asopa, V. N. (1990) "Seed Industry in India-A Management Perspective". Oxford & IBH Publishing Co. (Pvt.) Ltd., New Delhi.

Socio-Economics and Planning Centre, Department of Agriculture. (2019) Cost of cultivation of paddy. Available at: https://www.doa.gov.lk/ICC/images/publication/cost_of_cultivation/cost_of_cultivation_19.pdf. (Accessed: 06 June 2021).

Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R. and Polasky, S. (2002) "Agricultural sustainability and intensive production practices". Nature, 418(6898), pp.671-677.

United States Department of Agriculture. (2020) Grain and feed annual. Available at: https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Grain%20and%20Feed%20Annual_New%20Delhi_Sri%20Lanka_03-27-2020. (Accessed: 30 March 2021).

Weerasena, S. L. and Madawanarachchi, W. P. (2000) Improving quality seed supply in rice. Available at: <http://doa.nsf.ac.lk/bitstream/handle/1/2957/ASDA-2000-453.pdf?sequence=2&isAllowed=y>. Accessed: 23 April 2021.