OPENING MINDS:
RESEARCH FOR SUSTAINABLE
DEVELOPMENT

Investigation on Farmer Level Problems for Low Productivity of Paddy Cultivation in Mahagirilla Agrarian Services Division in Sri Lanka

W.B.O.N. Kumari, D.N. Sirisena and C.S. De Silva*

Department of Agricultural Engineering, The Open University of Sri Lanka, Nugegoda, Sri Lanka

**Corresponding author: Email: csdes@ou.ac.lk*

1 INTRODUCTION

Supplying enough food for the ever growing population has become one of the big challenges facing Sri Lanka today. According to the paddy statistics throughout the past 10 years in Maha and yala seasons, Anuradhapura, Polonnaruwa and Ampara maintain higher average yield than the national average yield (Premaratne and Sangakkara, 2014). Kurunegala has less average yield than the national average yield which should be taken in to consideration because this indicates that there is a clear difference between the potential yield and the farmers' yield in unit land area of the Kurunegala district. It is known that management of water and fertilizer is important to reduce the above yield gap or to increase yield per unit area (Bandara et al., 2006; Datta, 1981). Therefore this study was designed to investigate farmer level problems contributing to low productivity of paddy cultivation with special reference to water management and fertilizing. The specific focus of the study was to examine the prevailing cultural practices, to study the socio-economic conditions of the paddy farmers, and to identify to which extent the farmers have adapted new technological practices to overcome the prevailing problems in Mahagirilla agrarian services division.

2 METHODOLOGY

2.1 Sample design

The target population was farmers who were engaged in paddy cultivation in Mahagirilla Agrarian service Division with all major, minor and rainfed schemes of irrigation systems. There are 16 Grama Niladhari divisions which belong to two Agriculture Instructor divisions. According to Mahagirilla Agrarian Service Division farmer registered book there were 3522 farmers who are engaged in paddy farming. 300 farmers who were engaged in paddy farming from each of the Grama Niladhari division, farming under major, minor and rain fed schemes irrigation systems would be considered as a sample. Farmers were selected using random sampling method and 100 from major schemes, 100 from minor schemes and 100 from rain fed irrigation system.

Data was collected by method of a pre-tested Questionnaire to be filled by the interviewee. There were 45 questions covering the areas of socio-economic constraints regarding paddy farming, prevailing farming practices among farmers, water management and fertilizer problems, adaptation of new technologies with reference to water management and fertilizing (use of leaf colour chart, soil testing, use of parachute technique, use of transplanter machine)

2.2 Data Collection and Analysis

Qualitative as well as quantitative data were collected; both primary as well as secondary data were used. Secondary data were used to supplement the findings. Key Informant Discussions (KID) was used to strengthen the quantitative findings. Secondary data were collected using the publications of Sri Lanka Census and Statistics Department, Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI), World Bank publications etc. Data analysis was conducted using the Statistical Package for Social Sciences (SPSS) and Microsoft Excel 2007. Descriptive statistics along with frequency tables were used. Correlation tests were used for inferential analysis of data. The results obtained from the quantitative analysis were supported by the qualitative data obtained through discussions, interviews and observations.

3 RESULTS AND DISCUSSION

3.1 Basic information about the farmer –age distribution

Mahagirilla Agrarian service Division area belonged to the rural, and dry climatic zone in Sri Lanka. Figure 1 shows that, out of the total number of respondents 45% represents were above the age category 61 years, which reflects the reduction of new entries from young ages to the agriculture industry (paddy cultivation).

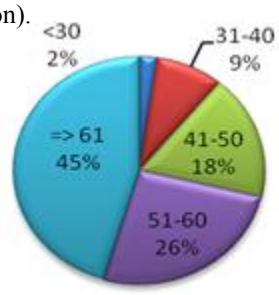

Figure 1: Age distribution of the farmers
Source: Survey data of farmers in Mahagirilla ASD area

3.2 Paddy farming main income

It is observed that 93% of the tested sample in Mahagirilla Agrarian service division fully depends on paddy farming. There are only 7% of farmers who have an alternative income sources (Figure 2).

Figure 2: Paddy farming-Main income
Source: Survey data of farmers in Mahagirilla ASD area

3.3 Duration of land preparation

The prevailing cultural practices shows that the majority of the farmers are not following the standard land preparation duration due to various reasons. This was because farmers have waited until the filling of the tanks/wewa completely to start cultivation and limited time s remained to allocate land preparation. Only one third of the farmer group has been following 21 days land preparation time, which is recommended to be followed by the Department of Agriculture.

3.4 Planting methods

Out of the considered four planting methods, only 13% of farmers have adapted transplanting by Transplanter machine and use of parachute technology which are the new technological planting methods in use today. It reflects the fact that more than 75% of farmers are reluctant to practice the advanced planting methods although they have been made aware by the Department of Agriculture (Figure 3). Also though the broadcasting

ISSN 2012-9916 © The Open University of Sri Lanka

method requires more seeds than other methods, the highest number of farmers tends to use broadcasting as it is the easiest method. Furthermore, the water requirement of rice crop varies with the method of crop establishment, and water has been identified as a scare resource in Mahagirilla Agrarian Services Division. But these analysed data show that the farmers did not get the benefit of practicing new technological methods which have the ability of saving water.

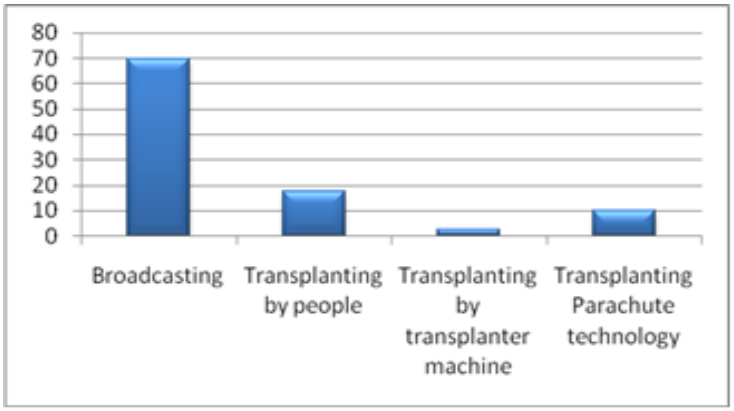

Figure 3: Planting methods used by farmers in percentage
Source: Survey data of farmers in Mahagirilla ASD area

3.5 Fertilizer Application

As it takes about 3 months to make compost, a majority of the farmers were not concerned about pre preparation of compost which is enough for the next season. It is obvious that the farmers who use major irrigation system and apply chemical and organic fertilizers get higher average yield. As per the Table 1, average yield of minor irrigation systems achieved almost the same average yield of major irrigation schemes as these major and minor irrigation system farmers use organic fertilizers with chemical fertilizer. When only chemical fertilizer is applied the yield is less. This proves that the method of fertilizing has contributed to the low productivity of paddy cultivation in Mahagirilla Agrarian Service Division.

Table 1: Average yield per farmer (Bushel/Ac) against method of fertilizer application

	Average yield per farmer (Bushel/Ac)		
	Major	**Minor**	**Rain fed**
Used Chemical+Organic fertilizer	108.64	98.74	58.26
Used only Chemical fertilizer	87.48	74.48	44.78

Source: Survey data of farmers in Mahagirilla ASD area

3.6 Water supply method

Among the considered sample, 16% of those who had faced the water shortage problem are able to overcome the problem by having alternative water storing sources like rain water harvesting ponds and agro wells. Unfortunately 5% of farmers of the considered sample had to abandon their cultivation due to severe water shortage. However 79% of the sample population did not do any water

supply method and received very low yields (Figure 4). Water shortage is the major problem due to climate change impacts which agrees with this finding. (De Silva et. al., 2007)

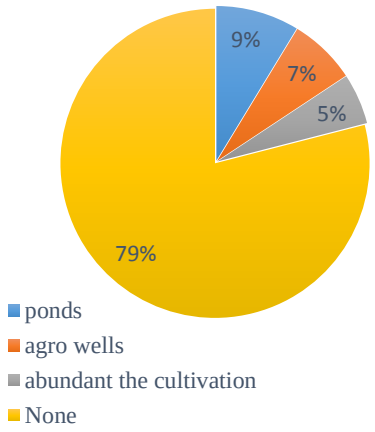

Figure 4: Water supply method (when the available water is not sufficient)
Source: Survey data of farmers in Mahagirilla ASD area

4 CONCLUSIONS

In Mahagirlla Agrarian division, 93% of the farmers are fully dependent on the paddy farming. The age distribution showed that the involvement of the new generation of below 30 years age category is only 2% of the farmers and almost half of the population is above 61 years old. By representation only 13% of the farmers are adapting new technologies such as transplanters for planting and majority still use broadcasting method for the paddy. When chemical fertilizers are applied with organic fertilizers the yield of paddy is better in major, minor and rainfed cultivations. Water shortage is the major problem and the majority (79%) of the farmers obtained low yield due to water shortage problem. Not using modern planting methods also attributes to the low yield in the study area.

REFERENCES

Bandara, W. M. J., Kumaragamage, D., Wickramasinghe, D. B., and Weerawarna, S. B. A. (2006). A site-specific fertilizer recommendation for rice grown in imperfectly drained reddish brown earth soils in low country dry zone of Sri Lanka. Tropical Agricultural Research, 18, 48–62.

Datta, S. K. De. (1981). Principles and practices of rice production. Sementara, 642. https://doi.org/10.1007/s13398-014-0173-7.2

De Silva, C. S., Weatherhead, E. K., Knox, J. W., and Rodriguez-Diaz, J. A. (2007). Predicting the impacts of climate change-A case study of paddy irrigation water requirements in Sri Lanka. Agricultural Water Management, 93(1–2), 19–29.https://doi.org/10.1016/j.agwat.2007.06.003

Premaratne, K., and Sangakkara.U (2014). Integrated nutrient management for lowland rice (Oryza sativa L.) in the Anuradhapura district of Sri Lanka. Tropical Agricultural Research, 25(2), 266– 271.

ISSN 2012-9916 © The Open University of Sri Lanka