

# Adoption of agronomic practices by smallholder rice farmers in Ampara district

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**Abstract**— Sri Lanka's staple food rice is cultivated all over the country. In most part of Sri Lanka rice is grown on small holdings. Ampara district is one of the major rice producing districts in the country. The total production in the year 2012 was 615, 291 mt. The dependence of rural households on agriculture for employment and food security especially in rice farming is inevitable. Although introduction of high yielding rice varieties and improved agronomic practices have contributed to achieve self sufficiency in rice, majority of poor households, predominantly small scale farmers are still experiencing food shortage and poverty. The adoption of appropriate rice agronomic practices is essential to improve the final output of rice cultivation. Since adoption leads to increased production, it is vital to find out the adoption level of smallholder paddy farmers in the district. In this regard, a study was designed to investigate the adoption of agronomic practices by the smallholder paddy farmers in Ampara district.

Hundred number of smallholder paddy farmers with 120 ha of landholdings were randomly selected for this study. Structured questionnaires were used to collect primary data. Secondary data necessary for the study were obtained from relevant sources. The study reveals that the use of combined paddy harvesters for harvesting purpose is in increasing trend in the district. Around 350 combined paddy harvesters were available in the district with different types. Kubota, John Deere and Agrotech are the common types used by the paddy farmers in the district. Majority of the smallholders (82%) are using machineries for land preparation (Around 70% of them are using four wheel tractors and 12% are using two wheel tractors for land preparation), threshing (92%), and winnowing (98%). Majority of the farmers (97%) in the district were not satisfied with paddy storage facilities provided by the government. It was good to note that 88% of the smallholder paddy farmers in the district apply the recommended level of fertilizers. Almost all the farmers (99%) were practising chemical pest and disease control. It was also found that majority of them were not aware of Integrated Pest and Disease management practices. Therefore, actions need to be taken by the Extension Officers and other relevant officers to educate the smallholder paddy farmers in the Ampara district especially regarding Integrated Pest and

Disease management practices and make them to adopt those practices.

**Keywords**— Adoption, Agronomic practices, Paddy farmers

## I. INTRODUCTION

Rice is the single most important crop occupying 34 percent (0.77 million ha) of the total cultivated area in Sri Lanka. On average 560,000 ha are cultivated during maha and 310,000 ha during yala making the average annual extent sown with rice to about 870,000 ha. About 1.8 million farm families are engaged in paddy cultivation island-wide. Sri Lanka currently produces 2.7 million t of rough rice annually and satisfies around 95 percent of the domestic requirement. Rice provides 45% total calorie and 40% total protein requirement of an average Sri Lankan. The per capita consumption of rice fluctuates around 100 kg per year depending on the price of rice, bread and wheat flour (DOA, 2010).

The most widely practised farming system in Sri Lanka is lowland paddy farming. Lowland can be defined as areas that receive enough water or that can be irrigated. In the lowlands, rice is the dominant crop both in terms of land use and dietary importance, and it has been the backbone of Sri Lanka's agriculture over 2,500 years. Ampara is one of the leading rice growing district in Sri Lanka, has been cultivating rice from time immemorial as this district is endowed with all favourable climatic conditions suitable for rice growing (Thedchanamoorthy, 2005). The dependence of rural households on agriculture for employment and food security especially in rice farming is inevitable. Although introduction of high yielding rice varieties and improved agronomic practices have contributed to achieve self sufficiency in rice, majority of poor households, predominantly small scale farmers are still experiencing food shortage and poverty. The adoption of appropriate rice agronomic practices is essential to improve the final output of rice cultivation. To increase the output of the smallholder rice farmers in the Ampara district, it is necessary to find out the adoption level of rice agronomic practices by the smallholder rice farmers. In this regard, a study was designed to investigate the adoption

of agronomic practices by the smallholder paddy farmers in Ampara district.

## II. METHODOLOGY

### A. The Study Area

Ampara district is located in the eastern province of Sri Lanka and is bordered by the Indian Ocean on east and the districts of Moneragala and Badulla to west, Batticaloa to north and Hambanthota to the south. Ampara district consists of 20 Divisional Secretariat divisions and there are 524 Grama Niladhari divisions in Ampara district. Agriculture is the prominent income source of the people in Ampara district and it is one of the major rice producing districts in the country. Ampara district belongs to the lowland dry zone under the agro ecological zones and the climate is highly favourable for paddy and other field crops. The annual average rainfall varies between 1500 mm – 2000 mm (WFP, 2009).

The paddy productivity is also very high in Ampara district with the cropping methods practiced. Approximately 8% of annual gross national paddy production is recorded from Ampara district (WFP, 2009). Moreover, Ampara district consists of approximately 115 km of coastal belt which is very important under the fisheries industry. The Mahaweli and Gal oya major irrigation schemes and large number of minor cascade systems are providing the water for agricultural lands in dry season. Maha season is the main cropping season for Ampara district.

There are about 123,081 agricultural holdings in Ampara district 67,778 holdings are having less than 0.1 ha of area under agriculture (WFP, 2009). Paddy is the main seasonal crop cultivated in both yala and maha seasons. The other field crops such as vegetables, chillies, cow pea, green gram and black gram are grown mainly in yala season. Approximately, 60,500 ha of paddy lands are under the major irrigations systems. There are about 2,300 and 7,250 ha of paddy lands under minor irrigation systems and raised systems respectively (WFP, 2009).

### B. Data Collection and Analysis

The population of this study consisted of smallholder rice farmers in Ampara district. The list of registered smallholder paddy farmers was obtained from Agrarian Service Centres from two significant paddy producing Divisional Secretariat divisions in Ampara district. From the list obtained, 100 numbers of smallholder rice farmers were randomly selected for this study purpose. Questionnaire survey was employed to collect the primary data. Secondary data necessary for the study also obtained from the relevant sources. Data collected were analysed by using SPSS version 14.0. The results are largely based on descriptive statistics.

## III. RESULTS AND DISCUSSION

### A. Demographic Characteristics of Paddy Farmers

The results revealed that majority (96%) of the farmers were male with more than 30 years of age. It was further revealed that 74% of the smallholder paddy farmers in the district educated up to primary level. Hence education needs to be considered as vital component during the dissemination of improved technologies, especially to traditional paddy growers. Almost half of the smallholder paddy farmers received monthly income between Rs. 3, 000/- to Rs. 5, 000/- and 68% of them were recipients of poverty assistants from the government. It should be regarded as a bottleneck for the adoption of recommended improved technologies. Majority of the paddy smallholders (86%) used their own land for cultivation. Nearly 72% of the farmers had their membership with agriculture related social organizations. These socio economic and personal characteristics of smallholder paddy farmers need to be taken in to consideration since these factors determine the adoption of crop management practices. It was found out from a study carried out by Soni *et al.* (2000) reported that there was a positive association with the socio economic characteristics of farmers and the extent of adoption of modern crop management practices.

### B. Adoption of Agronomic Practices

Table 1 show different agronomic practices adopted by the smallholder paddy farmers in Ampara district and the percentage of farmers adopted the particular practice.

Practice	Adoption percentage
Application of recommended level of fertilizer	88
Organic matter application	60
Chemical weed management	96
Chemical pest and disease management	99

Table 1. Adopted agronomic practices by smallholder rice farmers

According to table 1, majority (88%) of the rice farmers had applied recommended level of fertilizers to their paddy lands. Excessive use of fertilizers (8%) has been reported in some surveyed areas. Fertilizer application based on soil testing will greatly economize the fertilizer use efficiency and reduce soil toxicity problems. Organic matter application is an important practice in soil fertility improvement. The only organic matter that the smallholder rice farmers in the Ampara district used in the paddy field was paddy straw. Around 60% of the rice farmers in the district reported that they have used paddy straw in the field. Other forms of organic manure applications such as green manuring were not generally practices in the district.

Almost all the smallholder rice farmers in the Ampara district practiced chemical pest and disease control (99%) and chemical weed control (96%). The study shows that information on appropriate plant protection technologies such as integrated pest and disease management are not reaching majority of farmers. Most of the smallholder farmers in the study area were not aware about integrated pest and disease management. The pesticide application creates more problems than benefits in crop farming. Integrated pest and disease management practices greatly reduce the use of pesticides whereby the cost of cultivation is very much reduced and the environment is protected. Though, this integrated approach is widely practiced in several countries and in some parts of Sri Lanka, its application is very much limited in the study area. It is recommended to introduce Integrated Pest and Disease Management practices among farmers through Demonstrations and Trainings.

### C. Usage of Machineries for Agronomic Practices

Table 2 shows the usage of machineries by the smallholder paddy farmers in the Ampara district for various agronomic practices.

Practice	Use of machineries
Land preparation by tractors	82
Harvesting – use of combined paddy harvesters	56
Threshing	92
Winnowing	98
Cleaning	28

Table 2. Usage of machineries for different agronomic practices by smallholder rice farmers

Table 2 reveals that 82% of the smallholder rice farmers used tractors to prepare their land for rice cultivation. Among them, around 70% of the farmers used four wheel tractors and 12% of them used two wheel tractors for land preparation. Use of Combined Harvesters is on the increase in Ampara. This is mainly attributed to reduced cost compared to manual harvest and shortage of seasonal labour. During the study, more than half of the population (56%) of the smallholder paddy farmers used combined paddy harvesters for harvesting their paddy fields. Mahrouf and Rafeek (2003) reported that adoption of Combined Harvesters by farmers has both advantages and disadvantages compared to manual reaping. Advantages included faster harvesting, lesser labour requirement, reduced costs, minimized grain losses, quicker handling, faster and easier threshing and increased income to farmers. Disadvantages include displacement of labour and reduction of income of labourers with limited alternative income opportunities.

It is also evident from the table 2 that majority of the smallholder paddy farmers in the Ampara district used machineries for threshing (92%) and winnowing (98%) the harvested paddy. It is also found out from the study that less number of paddy farmers in the Ampara district had used machineries for cleaning (28%) the harvested paddy.

Majority of the farmers (97%) in the district were not satisfied with paddy storage facilities provided by the government. The Paddy Marketing Board has only opened four storage facilities in the Mahaweli B zone, which relies heavily on paddy cultivation. As a result of these storage facilities being located a great distance from some agrarian settlement; farmers have to bear a considerable cost in order to transport their harvest to the storage facilities. Some of the minor storage facilities are in dire and need of renovation.

### III. CONCLUSIONS

The study concluded that majority of the smallholder paddy farmers in the Ampara district were male with educational stage up to primary level. More than half of the population had their membership with agricultural related social organizations and younger farmers have taken much interest in social involvement. However, their experience on paddy farming was low. Therefore, efficient extension programmes need to be conducted for the paddy smallholders by considering their social and economic conditions. It was also found that the majority of the respondents were having low incomes, due to which they were unable to adopt new farming practices. Use of Combined Harvesters is an increasing trend in the district. Use of machineries for threshing and winnowing were also found to be high in the district. Smallholder farmers were not satisfied with the storage facilities available to them. Since Ampara is one of the major rice producing districts in the country, actions need to be taken by the responsible officers to provide better and accessible storage facilities to the rice farmers in the district.

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