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Factors affecting the adoption of recommended agricultural practices by cashew growers in Mannar district of Sri Lanka

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Abstract
The present study was conducted to investigate the factors affecting the adoption of recommended agricultural practices and to determine the present level of adoption practices to cultivate the cashew farmers in Mannar District of Sri Lanka. In this study, a total 100 farmers were randomly selected from three Divisional Secretariats in Mannar District and details on adoption of recommended agricultural practices were collected from the farmers through structured questionnaire and interview. Result revealed that the communication channel significantly ($p<0.1$) and positively influences the adoption level of pest and disease management practices, and fertilizer application. Attributes of innovation significantly ($p< 0.1$) and positively influences the pest and disease management practices and pruning practices. Social system significantly ($p<0.1$) and positively influences the pre planting practices, pruning practices, fertilizer application and new varieties. Present level of adoption practices showed that, Fifty five percent of the respondents adopted for pre planting practices and 51% of farmers partially adopted for planting the recommended new varieties. More than half of the respondents were not adopted for recommended practices related to pruning practices (80%), pest and disease management (67%), and fertilizer application (51%).

Keywords: adoption, cashew farmers, recommended agricultural practices, and Mannar district

1. Introduction
The cashew tree, *Anacardium occidentale* L., belongs to the family of the Anacardiaceae. Cashew is a cash crop, which contributes 0.03% to GDP in Sri Lanka. Cashew was introduced from Brazil to Sri Lanka by early Portuguese settlers in the 16th century and later spread as a dry land crop in the drier part of the country and has developed an important agricultural crop (Lakshmi *et al*., 2000) [7]. Cashew cultivation is best in dry zones because the climatic elements and soil conditions are favorable for getting a good yield (Azam *et al*., 2001) [3]. At present, cashew is becoming a valuable crop for farmers in Sri Lanka where there is a great potential for better production for the local and export market and which is generating more job opportunities to a higher number of farmers and small scale producers in Sri Lanka (Jayasekera, 2005) [6].

A total extent of cashew at present is about 30,000 ha which is cultivated in almost all the Districts. The average yield is 350kg/ha (Abeysinghe *et al*., 2003) [1]. The national average yield of cashew in Sri Lanka is 341.4kg/ha, but potential yield is more than two times of that. The national average yield of cashew is approximately 4-5kg/tree/year, which is far below the potential yield (10-12kg/tree/year) (Sri Lanka Cashew Corporation, 2010) [13]. Mannar is one of an agricultural districts in Sri Lanka. The total extent of cashew cultivation in Mannar is 170ha. Cashew has a higher potential for growing in Mannar due to its tolerance to moisture stress over long periods (Jayasekera, 2005) [6]. There may be several factors contributing to the level of production, to these poor adoption and lack of knowledge of recommended technologies. The major constraint in cashew cultivation is the yield gap between potential level and national average yield because of lack of adoption of proper agro technology (Madhubhashini *et al*., 2013) [8].

The objective of the study was to determine the vital factors that affecting the adoption of agricultural practices recommended by the Sri Lanka Cashew Corporation, to investigate the present level of adoption practices by cashew growers and to provide the extension services to improve the knowledge, skills and attitudes on these practices to produce the higher production and productivity of cashew in Mannar District of Sri Lanka.

2. Methodology
2.1 Study area
The study was carried out in the Mannar District, Northern Province of Sri Lanka. Mannar District, located at 8.52′N latitude 80°05′E longitude and the elevation is 29 m above sea level. Land area of Mannar District is 1,996 km^2 and mean temperature, annual rainfall and relative humidity were 28.4°C, 1,973.7mm and 89%, respectively.

2.2 Sample size and sampling method
In this study, 100 individual farmers were randomly selected from three DS divisions, Mannar town, Nanattan, and Madhu where numbers of cashew growers were high. A pretested questionnaire was used to collect the information from growers to find out the factors that affecting the adoption of recommended agricultural practices in Mannar District.

2.3 Conceptual framework
Social system, communication channel, attributes of

innovation were considered as factors that affecting the adoption of agricultural practices recommended by the Sri Lanka Cashew Corporation. This framework was developed based on Roger's adoption of innovation (Rogers, 2003) [13].

2.4 Information from farmers

Data were collected from farmers at present level of adoption practices; knowledge of pre planting practices, establishment of new varieties, fertilizer application, pest-disease management and pruning practices through the structured interview and key informant discussions with agricultural extension officers, farmer leaders and field officers of the Cashew Corporation were done to gather additional information.

2.5 Data analysis

Collected data were statistically analyzed in descriptive and inferential statistic model using the statistical package for social science (SPSS version 20.0) software. *P* values less than 0.05 were considered the level of significance of the result.

3. Results and discussions

3.1 Socio economic background

The present study was conducted using the details of 100 cashew farmers. Only 40% of surveyed farmers in Mannar District were involved in cashew cultivation as their primary source of income, so it can be considered as an important secondary livelihood in this rural area. Similarly, 51% of cashew farmers were categorized as small-scale cultivators, in which a farmer owned less than five acres land extent and 45% of farmers were categorized as medium-scale cultivators (owning 5-10 acres) while, the remaining 4% were identified as large-scale cultivators (owning above10 acres).

Most of the farmers (68%) had more than four years' experience in cashew cultivation and 21% had participated in some kind of training session on cashew cultivation conducted by SLCC. Background education was adequate, as 53% of cashew farmers had studied up to General Certificate of Education (GCE) Ordinary level and13% had gone on to GCE Advanced level. This supported the proposition by Caswell *et al*. (2001) [4] that farmers could be educated about recommended management practices, the importance of sustainable cashew cultivation.

3.2 Cashew cultivation system

The majority of the farmers (90%) had the ownership of their lands. Some of the farmers (10%) had cultivated in encroached lands. Seedlings and budded plants were used as a planting material in cashew farming. However, the 74% had cultivated seedling plants, and 9% of the farmers cultivated both seedlings and budded plants, while 17% cultivated as only budded plants which give more yield during a short period (Sri Lanka Cashew Corporation, 2010) [13].

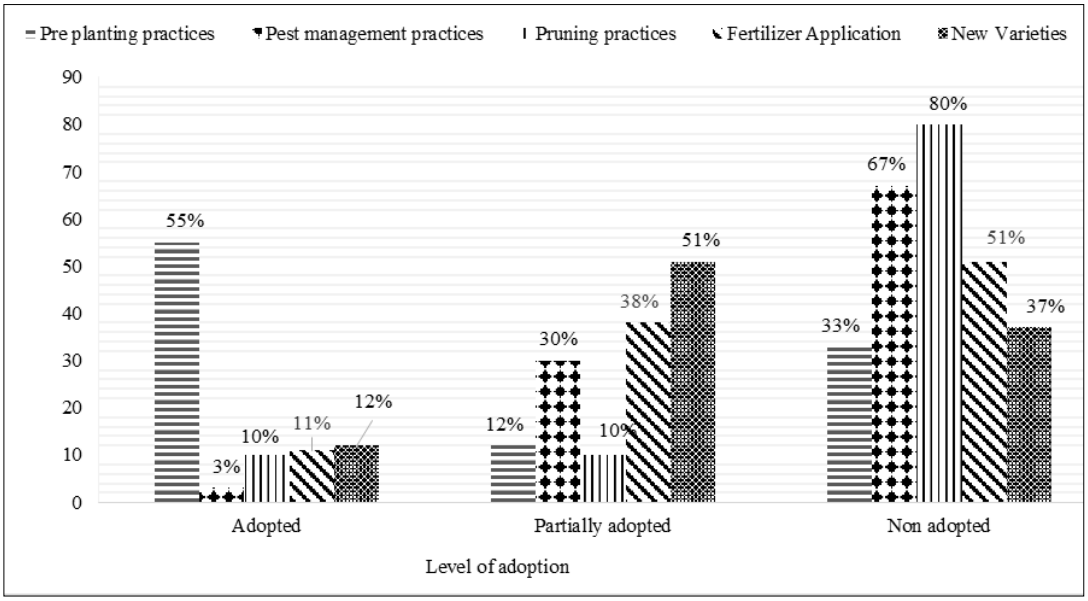

Fig 1: Adoption level of recommended practices

3.3 Adoption of pre planting practices

In this study, the adopted level of recommended pre planting practices was 55% and partially adopted level was 12%, while 33% of farmers were not adopted related to pre planting practices (Figure 1). Farmers very are reluctant to practice the weed management properly. Harmful effects of weeds are higher during the early stage of development, as the roots of weeds and seedlings are in the same layer of soil, thus competing for water and nutrients (Opoku-Ameyaw *et al*., 2012) [11].

3.4 Adoption of pest and disease management practices

The non-adopted level of pest and disease management practices was 67% and 30% of farmers were partially adopters, while few amount of farmers (3%) were adopted to pest and disease management practices (Figure 1). Pests and

disease are a major problem encountered in cashew cultivation and chemical application methods had been recommended for the management of cashew stem borer, root borer and the most devastating pests of cashew crop. However, the adoption of farmers to apply the chemicals recommended by the SLCC is very low (Wijetunge *et al*, 2003) [15].

3.5 Adoption of Pruning practices

80% of farmers were poorest adopters of pruning practices, while both adopters and partially adopters were 10% (Figure 1). Pruning practices are one of the best agricultural practices to increase the productivity. However, farmer's attitude and knowledge of pruning practices were negative and poor respectively (Dendena *et al*., 2014) [5]. Pruning should be carried out once a year and is conducted most commonly after the seasonal fruiting to promote the growth of a uniform canopy and avoid overcrowding (Asogwa *et al*., 2008) [2].

3.6 Adoption of fertilizer application

There is a recommended amount of fertilizer for this crop. However, 51% of farmers were non adopters of the recommended fertilizer application, while 38% of farmers were partially adopted, while 11% of farmers were adopters (Figure 1). Farmers not well adapted for applying the proper amount of fertilizer and time on growth stage of the plant. Such timing was shown to reduce late flowering and nut drop (O'Farrell *et al*., 2010).

3.7 Adoption of new varieties

Of the cashew growers, 51% had partially adopted to grow the new varieties and was adopted in 12% (Figure 1). High yielding new varieties had the ability to produce good quality nut and a yield of over 15kg/tree/year (Jayasekera, 2003) [1]. Farmers still do not adopt because they were getting higher yield from their old cashew trees (McMillan *et al*., 2002) [9].

Table 1: Factors affecting the adoption of recommended agricultural practices

Model	P value	Constant	R square	B value	Sig
Pre planting practices	0.049	15.009	30.7		
Communication Channel				0.044	NS
Attributes of Innovation				0.024	NS
Social system				0.088	***
Pest management practices	0.032	11.168	20.5		
Communication Channel				0.033	**
Attributes of Innovation				0.037	**
Social system				0.04	NS
Pruning practices	0.027	21.420	58.4		
Communication Channel				0.024	NS
Attributes of Innovation				0.041	***
Social system				0.037	***
Fertilizer Application	0.001	14.762	19.7		
Communication Channel				0.133	***
Attributes of Innovation				0.048	NS
Social system				0.028	**
New Varieties	0.000	3.730	46.5		
Communication Channel				0.006	NS
Attributes of Innovation				0.030	NS
Social system				0.044	***

It showed that communication channel significantly ($p<0.1$) and positively influences the adoption level of pest and disease management practices, and fertilizer application. Attributes of innovation significantly ($p< 0.1$) and positively influences the pest and disease management practices and pruning practices. Social system significantly ($p<0.1$) and positively influences the pre planting practices, pruning practices, recommended fertilizer application, and new varieties.

In addition, there were many reasons for non-adoption process of cashew farmers, the majority of the farmers' major reasons were the high cost of machineries, lack of credit, lack of knowledge and experience to operate machineries. However, farmers could be able to market their product in reasonable price.

4. Conclusion

Adoption of recommended agricultural practices of the cashew farmers depends on various factors in Mannar District of Sri Lanka. The communication channel, attribute of innovations and social system significantly and positively influences the adoption level of agricultural practices recommended by SLCC. More than half of the respondents were not adopted as recommended practices related to pest and disease management, fertilizer application and pruning practices and fifty one percent of farmers had partially adopted to establishment of new varieties, while 55% of the respondents adopted to pre planting practices. However, extension services are needed to relate to recommend agricultural practices in cashew cultivation to increase the productivity and product quality in Mannar District of Sri Lanka.

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