

Adapting of Information on Rubber Farming by Rubber Smallholders: A Case Study in Moneragala District

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Abstract

The purpose of this study was to assess the utilization of information on rubber farming by Rubber Smallholders (RSs) and the sample was 389 RSs using stratified random sampling technique. The level of Utilization of Information on Rubber Farming (UIRF) was measured by developed score. The Logistic regression of analysis was employed in understanding the relationship between UIRF scores and socio-economic variables of RSs by the STATA version 19. The most prominent sources of information on rubber farming were rubber smallholders (71%), rubber extension officials (11%), social media (5%) and extension programmes (4%), while radio (0.5%) and television (0.5%) were the lowest used sources. Most of the RSs had a low utilization category (54%), while 13 % had a high utilization category. The mean UIRF score was 38 % (ranged from 05 % to 71%). The most preferred information sources by RSs were extension programmes (90%), RSs (85%), rubber traders (85%) and social media (70%). The most needed information by RSs is on rubber market prices (100%), followed by fertilizer application (92%), tapping (90 %), management of Tapping Panel Dryness (90%), disease management (85%) and sheet rubber making (80%). The perceived issues of accessing information by RSs highlighted that inadequate extension personnel (92 %), gets unreliable information (79 %), poor mechanism of distribution of Rubber Puvath (79 %) and lack of social media interventions (88%). RSs' age, level of education, rubber land extent, membership of the Thurusaviya rubber society and full-time farmer were significantly and positively correlated to UIRF. Both approaches of ICT based cyber extension and establishing para extension service are proposed strategies to improving the information accessibility of smallholder rubber sector.

Keywords: *Information, Rubber farming, Socio economics, Social media, extension service*

I. INTRODUCTION

Agriculture-related data that is transformed into meaningful and practical contexts for efficient decision-making in the agriculture sector is referred to as agricultural information, which is essential for boosting agricultural productivity (Aina et al., 2015; Tadesse, 2018) and a vital tool for the growth of farmers' livelihoods (Nwali et al., 2022). The governmental, non-governmental and private organizations have created and published agricultural information which is accessible in either primary or secondary form (Olaniyi, Adetumbi and Adereti, 2018). Information sources available to farmers include the internet, extension agents, mass media, contact farmers, traders, etc. (Ngathou et al., 2015; Olorunniyi et al., 2022).

Rubber Farming (RF) totally depends on the technical agricultural information which is produced and disseminated by the Rubber Research Institute of Sri Lanka (RRISL). Therefore, assessing the dissemination of information on RF into the smallholder rubber sector is a vital investment to enhance the productivity and overall performance of the industry. As, in the Sri Lankan context, the rubber smallholder sector is the most dynamic segment of the rubber sector as it represents 68 % of the total rubber extent of Sri Lanka and it contributes 69% to the national rubber production (MPI, 2022).

A. Problem Statement and Importance of the Study

The new RF introducing areas in Moneragala district is the first intermediate zone where RF has been implemented in Sri Lanka. At present, the total extent of rubber smallholdings in Moneragala is about 4,402 ha, which involves 7,802 holdings in number (MPI, 2017).

Gunarathne et al., 2020 reported that RSs' knowledge and adoption levels on RF is low in Moneragala. On this background, assessment of accessibility of RF information by RSs has a great impact on the decision-making tool to improve the knowledge and adoption levels of RF practices in these areas. The findings of the study also provide the necessary feedback mechanism for the media organizations, policy makers and the extension organizations for developing the strategies, ultimately improving the sustainability of RF in Moneragala district.

B. Objectives of the Study

The main objective of this study was to assess the utilization of information on RF by RSs in Moneragala District. The specific objectives were to; i. Identification of the level of utilization of information sources, ii. Determine the information sources accessible to RSs in the study area iii. Perceived issues of accessing information by RSs, iv. Determine the information needs of RF, vi. Effect of smallholders' socioeconomic characteristics on usage of RF information, vi. To make recommendations to improve the information accessibility and usage of the smallholder rubber sector in Moneragala. The findings will assist in designing a more effective information dissemination system of RF in Moneragala, as well as have a greater impact on the economic development of the country.

II. METHODOLOGY

A. Study Area and Sampling

Moneragala District (6.7563° N and 81.2519° E) was selected purposely as it is a newly planted area of rubber in the country. It is located in Uva province and is the second largest district in Sri Lanka with an extent of 565,930 ha. It has Wet, Intermediate and Dry climatic conditions and many agro-ecological regions, out of which IL1c, IL2 and IM 2b are suitable for rubber cultivation, which are distributed among eight Divisional Secretariat (DS) divisions (Gunarathne et al., 2022).

Three hundred eighty-nine RHs (at a 90% confidence interval) were selected for the core study using stratified random sampling technique, based on the geographical distribution of RSs in all rubber growing DS divisions (8) in Moneragala. Adopting the Raosoft web-based calculator

(<http://www.raosoft.com/samplesize.html>) for which stratification was applied on Twenty-three percent of the Grama Niladari (GN) divisions where the highest number of RSs could be found within each DS division were selected using the statistical sources, followed by random selection of the individual RSs according to the number in each GN division, so that the survey sample (23% of RSHs of each GN division) was randomly selected based on the number of RSs in each GN division.

B. Measurement of Variables and Data Collection

The radio, television, newspaper, social media, *Rubber Puwath*, RSs, rubber extension officials (RDD/RRISL), input supply traders and extension programmes and rubber traders were identified as the sources of Utilization of Information on Rubber Farming (UIRF) by RSs, based on the preliminary study. The UIRF by RSs was measured using a utilization scale which comprises three different levels of utilization; Regularly (2 times/ three months), Sometimes (1 times/ three months) and Never (0 times/ three months). The level of UIRF was measured by constructing the UIRF score. The equation for UIRF scores for individual rubber smallholders is given in equation 1.

$$UIRF\ score = \frac{\sum_{i=1}^n(Obs_i)}{\sum_{i=1}^n(Maxs_i)} \dots\dots\dots (1)$$

Obs_i = Observed UIRF score for ith rubber smallholder

Maxs_i = Maximum UIRF score for ith rubber smallholder

RSs were asked to mark their opinion on accessibility of RF information sources based on a five-point modified Likert-type scale (Strongly satisfy, satisfy, neutral, not-satisfy and strongly dis-satisfy) and asked to indicate the preferred information sources on RF which measured as most, moderate and least. In order to ascertain the information needs, an exhaustive list of possible information needs was prepared through meticulous review of literature, consultation with experts and extension personnel of RRISL. Responses of respondents were measured by not needed, needed and most needed. The respondents were asked to indicate the perceived issues of accessing information about RF. To understand how RSs' socioeconomic condition affects their

UIRF in Moneragala, the study variables and their relationships were conceptualized based on both theories of the uses and gratification and adoption-diffusion (Rogers, 2003), literature cited and views of the panel of experts of the rubber sector (Figure 01).

Studied independent variables and their description of measurements is shown in Table 01. A pre-tested questionnaire was used to collect primary data in 2022 (From March to August) by the author through personal interviews with the respondents, supplemented with secondary data from relevant sources.

C. Data Analysis

The respondents were separated into three perception categories viz. highest, moderate and least easiness of accessibility of RF information based on perception score by using the confidence interval method and categorized the respondents as follows; Least easiness of accessibility group = Below $X - 1.96.SE$, Moderate easiness of accessibility group = Between $X - 1.96.SE$ and $X + 1.96.SE$ and Highest easiness of accessibility group = Between $X + 1.96.SE$.

Cumulative frequency distribution and percentage analysis were used to quantify groups. UIRF score ranged from 0 to 100. The Logistic regression of analysis was employed in understanding the relationship between UIRF scores and variables listed in Table 01. STATA version 19 was employed in statistical and descriptive analyses.

IV. RESULTS AND DISCUSSION

A. Key socio-economic Profile of the Rubber Smallholders

Male RSs (81%) were dominated. The age of RSs in the sample varied between 29 to 68 years and the majority fall to the age group of 51 to 55 years. Nobody pertained in the categories of no school or higher education qualified. Around 51% of the RSs in the sample have studied up to Ordinary Level, while 21% studied up to Advanced Level. The majority of RSs (93%) in the sample engaged in full-time farming in the study area. The majority of the sample (nearly 60 %) had 11 to 15 years of Rubber Farming (RF) experience. The majority (80%) of the holdings fall to the size of 20-35 acres. The average cultivated land size of RF in the sample was around 1.01 ac.

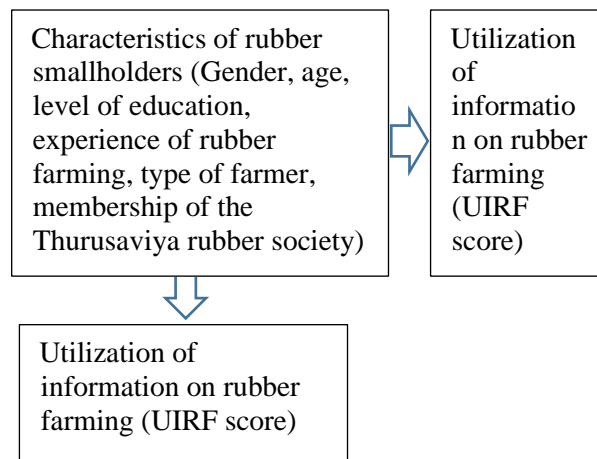


Figure 01: The conceptualization of study variables

Table 01: Independent Variables Used in the Analysis

Variable	Description of measurement
Age	Years
Gender	Male = 1, Female = 0
Level of education	Highest level of education completed
Experience of rubber farming	Years
Type of farmer	Full time farmer or not
Membership of the <i>Thurusaviya</i> rubber society	Yes=1, no=0

B. Major Sources of Information Usage and Its Accessibility by Rubber Smallholders

Table 02 shows the major sources of information by RSs in the study area. The interpersonal channels have higher relative usage by RSs than mass media. Most of RSs (71%) said they get their information from RSs, 11% of respondents get information from the extension officers of Rubber Development Department (RDD) and Rubber Research Institute of Sri Lanka (RRISL). Agreeing with the results of Banmekeand Ajayi 2008; Opera, 2008 and Odoemenem and Obinne, 2010 noted that the extension agents and fellow farmers were major sources of information for farmers. Agricultural extension services play a key role in disseminating scientifically proven agricultural information to smallholders that will help them to solve their farming problems in rural farmer societies (Rehman et al., 2018). There are many ways to disseminate agricultural information, some of which include demonstrations, public gatherings, group discussions, talks, television, radio, movies, flyers, bulletins, letters, circulars (Olorunniyi et al., (2022). RSs were marked by their preference of RF information sources based on a three-point scale (high, moderate and low) in Table 04. However, 4% of RSs get information from participation in extension programmes and most of RSs (90%) preferred to participate in extension programmes (Table 03). However, in the study area, extension personnel mentioned that they were unable to conduct extension programmes during the last two years due to two major issues, namely; lack of funds and unavailability of extension personnel. Agwu and Abubakar (2009) stated that method demonstration is the most effective method of information dissemination on improved agricultural technologies among farmers. Most of the time, practical demonstrations were practiced by extension personnel. Thus, the extension agents (rubber development officer and rubber extension officer) were mentioned by the majority of them as it may be attributed to the interpersonal interaction and immediate feedback enjoyed by RSs.

Another 3% of RSs get information from input supply traders and 2% are rubber traders. The preference for getting information from rubber traders (85%) is the second most preferred information source (Table 03), while input supply traders were last (3%). So, centres of rubber traders can be developed as rubber information

centers with the facilitation of ICTs. However, the utilization of radio, television and newspapers, like mass media, by organizations is at a very low level to disseminate information to the smaller-holder sector. These findings are verified by the studies of Yahaya (2002) and Tologbonse et al. (2006) which reveal that television, extension publications (bulletins, newsletters, posters and hand bills) were not considered as important sources of agricultural information among the farmers in Nigeria, while friends/neighbours/relations, extension agents and contact farmers were considered important in terms of availability and usage. The preference percentage of radio, television, newspaper and the *Rubber Puwath* are 60, 40, 15 and 55, respectively.

Rubber Puwath is published by RRISL in the Sinhala language with a simple form to familiarize scientific information among RSs. Although poor mechanisms are being used to distribute *Rubber Puwath* among the RSs in Moneragala, 1% of RSs are utilized as an information source. The utilization of social media is 5 % of the study sample. Most of the younger generation prefer to use social media to collect information about RF than older RSs. They created active WhatsApp groups to solve technical issues of RF. Seventy percent of RSs preferred information source is social media.

The mean UIRF score was 38 %, which ranged from 05 % to 71%. The level of UIRF is presented in Table 04. Nearly 50% of RSs in this study area consider the UIRF as the low utilization group. While, 13% of RSs consider it as a high utilization group, 33% of RSs consider it as a moderately utilized group. Based on these results, the overall UIRF presents an unsatisfactory in the study area.

As a summary, UIRF is not a satisfactory level based on evidence and more attention should be focused on developing strategies. These overall results show that more attention should be focused on developing strategies to enhance the utilization of information of RF, specially focusing on the social media which has high networking capacity, fastest and cost-effective method.

C. Information Needs by Rubber Smallholders

For information access to be effective, dissemination channels need to be oriented towards the user's needs and preference (Barbara

and White, 2001). The type of information needed by RSs in the study area is presented in Table 04. The result shows that the most needed information by RSs is on rubber market prices (100%), followed by fertilizer application (92%), tapping (90 %), management of Tapping Panel Dryness (90%), disease management (85%) and sheet rubber making (80%). They were least interested in information sheet rubber making (80%). The

reason could be that most of the RSs (56 %) produce latex for the market. This finding suggests that RSs made use of the information to increase rubber productivity and profit maximization. Extension personnel can provide effective transfer of technologies to their clients (RSs), if there is sufficient information on the information needs.

Table 02: Major Sources of Information usage by Rubber Smallholders

Source of information	Usage (%)		
	Regularly	Sometimes	Never
Interpersonal channels			
Rubber smallholders	71	29	00
Rubber extension officials	11	68	21
Input supply traders	03	02	95
Rubber traders	02	10	88
Participation of extension programmes	04	12	84
Mass media			
Radio	0.5	0.5	99
Television	0.5	0.5	99
Newspaper	01	08	91
Social media	05	25	70
<i>Rubber puwath</i>	01	05	94

Table 03: The Level of Utilization of Information Sources by Rubber Smallholders

Source of information	Perception on preference (%)		
	High	Moderate	Low
Interpersonal channels			
Rubber smallholders	85	05	10
Rubber extension officials	11	50	39
Input supply traders	03	07	90
Rubber traders	85	10	05
Participation of extension programmes	90	08	02
Mass media			
Radio	60	30	10
Television	40	50	10
Newspaper	15	60	25
Social media	70	05	25
<i>Rubber puwath</i>	55	10	35

Table 04: Type of Information Needed by Rubber Smallholders

Areas of information needs	Smallholders (%)
Rubber market prices	100
Fertilizer application	92
Tapping	90
Management of <i>Tapping Panel Dryness</i>	90
Disease management	85
Sheet rubber making	80

D. Perceived Issues of Accessing Information by Rubber Smallholders

The perceived issues of accessing information by RSs highlighted that inadequate extension personnel (92 %), 79 % get unreliable information, poor mechanism of distribution of Rubber Puwath (79 %) and lack of social media interventions (88%). New recruits for extension staff is a crucial issue in Moneragala. This will directly affect the inadequate extension personnel, unreliable information and absence of experts. To prevent this situation, a para-extension approach can be suggested. Especially agrarian officers and contact RSs in rubber growing areas can be empowered through knowledge and skill of RF. Proper distribution channel of Rubber Puwath should be established through Thurusaviya rubber societies. Poor infrastructure for ICT continues to be a significant barrier to RSs to access and use of information, particularly those in remote areas. This study indicates that 80% of individuals are not utilizing ICT as an information source due to inadequate access and unavailability. ICT based cyber extension approaches should be implemented through Thurusaviya rubber societies.

E. Effect of Socio-economic Characteristics of Rubber Smallholders on Utilization of Information

Socioeconomic characteristics are the position of an individual or group on the socioeconomic scale, which is defined by a combination of social and economic factors (Oduwole et al., 2022). The logistic regression results presented in Table 05 show the factors influencing the UIRF by RSs in Moneragala. The implication is that the dependent variables (UIRF score) included in the model (Adjusted R² = 0.67) accounted for 67% of the variations in the dependent variable. Accordingly, RF experience, level of education and rubber land

extent have a positive relationship to utilization of information.

The level of education is positively and significantly related to UIRF (> 0.05). This result supports the claim made by Fagbohunge and Longe (2009) that educated people have the capacity to use a variety of information sources. Education also makes it easier to access different types of information sources. More educated RSs can access and interpret the information from different sources. The extent of rubber land and experience of RF are positively related to UIRF score (<0.05). The majority of rubber land owners are small or medium-sized entrepreneurs and they're more interested in learning how to develop their rubber holdings further. Moneragala is a newly introduced rubber area, therefore experienced RSs find more information on RF for sustainability of RF.

The most extension professionals in developing countries are males and they frequently favour men in their extension work (Gunarathne et al., 2022). Matata et al. (2010) found that the extended message was biased against women. The most females (owners and their wives) (77%) of this study sample, participated in extension programs such as awareness programmes, workshops etc. However, the gender type of RSs does not affect (> 0.05) on their access to information about RF. The membership of the Thurusaviya rubber society, moreover influences RSs get to access to information, since information can be passed to a huge number of RSs at the same time through farmer groups and Thurusaviya rubber societies productively.

IV. CONCLUSION

Extension personnel and experienced rubber smallholders were generally utilized than the other information sources, by rubber smallholders in Moneragala district. Extension programs were indicated as the most preferred information source. Television and newspapers were barely accessible and utilized by the rubber smallholders. To ensure regular availability/accessibility of extension personnel, efforts should be made to

establish para-extension service technique. Proper distribution channel of *Rubber Puwath* and leaflets published by RRISL should be established on a regular basis through *Thurusaviya* rubber societies. Both approaches of ICT based cyber extension and establishing para extension service are proposed strategies to improve the information accessibility of smallholder rubber sector with the aim of developing the smallholder rubber sector.

Table 05: Logistic Regression of Analysis of the Effect of Social Economic Characteristics of Rubber Smallholders on their usage to Information

Characteristics	Coefficient	Std. Err	z	P-value
Age	0.106	0.0248	4.21	0.001*
Sex	0.124	0.0658	1.40	0.300
Level of education	0.206	0.0246	4.31	0.000*
Experience of rubber farming	0.309	0.0891	1.23	0.001*
Rubber land extent	0.213	0.0567	1.56	0.001*
Type of farmer	0.1052	0.0245	1.39	0.000*
Membership of the <i>Thurusaviya</i> rubber society	0.1121	0.0223	1.51	0.001*

Significant level *5%

REFERENCES

- Agwu, A. E and Abubakar. (2009) "Sources of Agricultural Information Used by Arable Crop Farmers in Isale Osun Farm Settlement, Osogbo L.G.A", *Journal of Agricultural Extension*, 13(1), pp. 7-11.
- Aina, L. O., Kaniki, A.M. and Ojambo, J. B. (2015) "Agriculture Information in Africa", *Ibadan Third World Information Services*, 11(9), pp. 67-78.
- Gunarathne P.K.K.S., Tennakoon T.M.S.P.K. and Edirisinghe J.C. (2020) "Strategies for Improving Rubber Productivity in Smallholder Rubber Farming: A Case Study in Moneragala District of Sri Lanka." *The Seventh International Conference on Multidisciplinary Approaches University of Sri Jayawardenapura, Gangodawila, Sri Lanka*, 9(1), pp. 53-64.
- Gunarathne P.K.K.S., Tennakoon T.M.S.P.K., Edirisinghe J.C. and Jayasundara K.K.I., (2021) "Job satisfaction among public sector extension personnel in the smallholder rubber sector: Special focus on the Moneragala District of Sri Lanka", *Multidisciplinary International Research Symposium of Rajarata University of Sri Lanka*, 6(12), pp. 39-41.
- Gunarathne, P.K.K.S. et al. (2022) "Smallholder rubber farming based agro-tourism: Potential, attitude and challenges in Sri Lanka-A case study in Moneragala District", *Journal of Tropical Forestry and Environment*, 11(02), pp. 23-26.
- Matata, P., et al. (2010) "Socio-economic factors influencing adoption of improved fallow practices among smallholder farmers in Western Tanzania", *African Journal of Agricultural Research*, 5(6), pp. 818-823.
- Ministry of Plantation Industries (MPI). (2022) "Statistical Information on Plantation Crops 2017", *Ministry of Plantation Industries*, 7(6), pp. 100-120.
- Ngathou, I. N., J. O. Bukenya and D. M. Chembezi. (2015) "Managing agricultural risk: examining information sources preferred by limited resource farmers", *Journal of Extension*, 44(6), pp. 10-12.
- Nwali P. N., Sennuga S. O and Emeka, O. (2022) "Evaluation of Small-scale Women Farmers' Utilization of ICT in Accessing Agricultural Information in Gwagwalada Area Council, Abuja, Nigeria", *Green Reports*, 3(7), pp. 34-38.
- Oduwole A. E., Sennuga S. O, Bako H. and Wilberforce, A. G. (2022) "Impact of Intensive Agricultural Training on Productivity of Smallholder Farmers: A Case Study of International Skill Acquisition Centre, Nasarawa State, Nigeria", *International Journal of Latest Research in Agriculture & Veterinary Sciences*, 04(01), pp. 18-24.
- Olaniyi, O.A., Adetumbi A., and Adereti, J.G. (2018) "Information on maize production among rural

youths”, *A solution for sustainable food security in Nigeria*, 7(3), pp. 10-13.

Olorunniyi A. A., Ezinne M. E., Osiboye, O. O. and Sennuga S. O. (2022) “Effect of social media in Enhancing Agricultural Extension among Farmers in Gwagwalada Area Council, Abuja”, *Journal of Research in Science and Technology*, 3(4), pp. 24-32.

Rehman, F., Muhammad, I., Ashraf, I. (2018) “Effect of farmers’ socioeconomic characteristics on access to agricultural information: Empirical evidence from Pakistan”, *The journal of Animal and Plant sciences*, 23(1), pp. 324-329.

Rogers, E. M., (2003) “Diffusion of innovation”. *An integrated approach to communication theory and research*, 5(3), pp. 432-448.

Tadesse, D. (2018) “Access and Utilization Agricultural Information by Resettler Farming Household”, *The Case of Metema Woreda, North Gender, Ethiopia*, 4(2), pp. 184-187.

Tologbonse, E.B., Mesini O. and Tsado, J.H. (2006) “Farmers perception of sources of information in relation to adoption of improved technology by farmers in inland valley swamps of middle-belt zone of Nigeria”, *Journal of Agriculture Extension*, 9(6), pp. 63-73.

Yahaya, M.K. (2002) “Gender and communication variables in agricultural information dissemination in two agro-ecological zones of Nigeria”, *Research Monograph. Ibadan: Corporate Graphics Ltd*, 9(1), pp. 43-51.