

Factors Affecting Technical Knowledge of Tea Small Holders in Sri Lanka

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ABSTRACT. *Low knowledge level of improved technologies of tea small holders has been partly responsible for their low production level. This situation is caused by, amongst other factors, weaknesses in dissemination of information to tea small holders. The objective of this study was to determine the tea small holders' knowledge in selected practices such as fertilizer use, pest and disease management, and pruning, and the related factors. Data were collected primarily from a stratified random sample of 317 small holders in Kandy, Matara, Nuwara Eliya and Badulla districts which cover all the categories of tea small holders in Sri Lanka, by personal interviews.*

Nearly half the small holders expect further information for the development of their small holdings. Only 18 percent small holders had full overall technical knowledge, while 73 percent had partial knowledge and 9 percent had no knowledge. However, these knowledge levels were different for different cultural practices. The knowledge level was highest in pruning (69%) and lowest in pest and disease management (13%). Socio-economic characteristics of the small holders such as education level, land size, type of labour, income from tea and the total annual income were positively associated with their knowledge of technology. However, age and type of employment of the tea small holders had no relationship with their knowledge of technology.

Knowledge level of the tea small holders had positive relationship with overall usefulness of the EO/TSHDA, news bulletins, neighbouring small holders and workers of plantations as information sources. Formal and informal information sources when used together had a significant positive relationship with the knowledge level of the small holders.

INTRODUCTION

Tea remains a predominant crop in Sri Lanka. It is an important source of foreign exchange earnings, accounting for about 13 percent of the total export earnings (Central Bank of Sri Lanka, 1994). Over 50 percent of the production came from the small holdings sector during 1991, 1992 and 1993 (Tea small Holdings Development Authority, 1994). However, the optimum levels of production are not achieved yet. According to the tea small holdings sector experts, the optimum average yield could be about 2400 kg/ha/annum. But, in 1993 it was only about 1500 kg/ha/annum (Bandara, 1994).

The low levels of adoption of improved technologies in tea small holdings may be one of the factors responsible for not achieving the optimum production level. Technical knowledge of practices is an important prerequisite for adopting these practices successfully.

The objective of this study was to determine the tea small holders' knowledge in selected agricultural practices such as fertilizer use, pest and disease management, and pruning and the related factors, viz. socio-economic characteristics of the tea small holders, usefulness of the information sources and the extension methods used by extension officers.

METHODS

Measurement of variables

Knowledge as a composite variable was measured by constructing indices. Knowledge was measured at three levels namely no, partial and full referring respectively to less than one-third, between one-third and two-thirds, and greater than two-thirds of the complete knowledge. Reliability coefficients were obtained by using Statistical Package for Social Sciences (SPSS) computer program. The items included in the indices and the respective reliability coefficients are as follows:

<u>Practice</u>	<u>Item</u>	<u>Reliability Coefficient</u>
Fertilizer use	Type, Amount, Frequency, Time	0.70
Pruning	Type, Length, Time, Height	0.82
Pest and disease management	Damage, Method of measurement	0.83
Overall	Fertilizer use, Pruning Pest and disease management	0.84

Sampling and data collection

Stratified random sample was drawn from the 1983 tea small holdings sector census report. Stratification was done on the basis of geographical distribution of tea small holdings. A total of 317 tea small holders from Kandy, Matara, Nuwara Eliya and Badulla districts which cover all the categories of tea small holdings in Sri Lanka were interviewed with the use of structured questionnaire. The data collected from the tea small holders were supplemented with information collected from extension officers and research officers of Tea Research Institute of Sri Lanka. Six case studies were conducted to supplement the findings from the analysis of primary data. Case studies were conducted to get better understanding of the level of technical knowledge of the small holders and to get evidence to supplement the findings of the interviews.

The data were analysed by using the following statistical techniques: frequency distribution, chi-square test, CATMOD, correlations and reliability test.

RESULTS AND DISCUSSION

Information sources of tea small holdings sector

Ten information sources can be listed as being generally used by tea small holders. They are extension officers (EOs) of the TSHDA, extension officers of the Tea Research Institute, higher officers of plantations (Managers and Assistant Managers), radio, news papers, news bulletins, commercial firms sales representatives/merchants, leaf collectors, workers of plantations and neighbouring small holders. About half the small holders reported that technical information received by them was not sufficient to develop their holdings successfully. Majority preferred to receive more information from formal sources such as EO/TSHDA (82.2%), bulletins (80.3%), radio (76.0%) and EO/TRI (61.3%). They are followed by neighbouring small holders and workers of plantations (71.1 and 64.8 percents, respectively).

Only 18.0 percent small holders had full overall technical knowledge, while 72.6 percent had partial knowledge and 9.4 percent had no knowledge. But, these knowledge levels were different for different cultural practices. The knowledge level was highest in pruning (68.6%) and lowest in pest and disease management (13.3%). Regarding fertilizer use 32.5 percent had full knowledge while 50.4 percent had partial knowledge. Formal and informal information

sources when used together had a significant positive relationship with knowledge level of the small holders.

Socio-economic characteristics and technical knowledge

The associations between socio-economic characteristics of the small holders and their overall technical knowledge were determined by chi square analysis.

Table 1 shows, that the age and type of employment of the small holders had no association with their knowledge of technology. The other characteristics of small holders namely educational level, land size, type of labour, income from tea and annual income were significantly associated with their knowledge of technology.

Considering educational level of the small holders and their overall knowledge of technology, of those who had completed secondary education (>13 years), 42.1 percent had full technical knowledge. On the other hand, only 17.8 percent of those farmers who had below 9 years educational level had full technical knowledge.

Table 1. Associations between socio-economic characteristics of the small holders and their technical knowledge.

Characteristics	Chi square
Age	7.79
Educational level	10.40*
Land size	19.60*
Type of labour	29.33*
Type of employment	8.16
Income from tea	80.04*
Annual income	76.81*

* significant at 0.05 level

Larger the holding size the higher the holder's technical knowledge. About 35 percent of the 2-5 acres category and 31.8 percent of the over 5 acres category had full knowledge, while the corresponding percentages for the other two categories (<1 and 1-2 acres) were only 12.0 and 18.5, respectively.

Farmers who used only hired labour had greater technical knowledge than others. Of those farmers using only hired labour, 36.9 percent had full knowledge, while among the other two categories of farmers only less than 16 percent had similar knowledge. This may be because farmers who used only hired labour were wealthy and educated. Those small holders who had higher income from tea had greater technical knowledge than others; 47.4 percent of the highest income category had full knowledge while the corresponding percentages for middle and low income categories were 22.3 and 3.4, respectively.

Usefulness of information sources and technical knowledge

Farmers like others gain knowledge through learning. Learning improves the ability to perform a behaviour pattern through experience and practice. Farmers learn from their own actions, from observing others' actions and from discussing relations between cause and effect. These learning processes depend on active involvement of the farmer. The extension agent or other formal sources can try to create a situation which makes learning easier for the farmer (Van den Ban and Hawkins, 1988). But, not only formal sources, informal sources such as neighbouring farmers and others also can have a great influence in this learning process. By this kind of learning, farmers capture cognitive, psychomotor and affective types of changes. Information sources as well as other elements of the information dissemination process influence learning and behavioural changes. The associations between small holders' perceived usefulness of information sources and their technical knowledge were examined by chi-square analysis.

Knowledge level of tea small holders was positively associated with perceived usefulness of the EO/TSHDA, news bulletins, neighbouring small holders and workers of plantations as information sources (Table 2).

Here the knowledge level and perceived usefulness of the sources have been tested individually. Farmers usually have contacts with more than one source. Experience of Vanuatu island shows that radio, print and field work:

Table 2. Associations between perceived usefulness of information sources and technical knowledge.

Information source	Chi-square
EO/TSHDA	8.42*
Radio	4.39
News bulletins	17.72*
Neighbouring small holders	6.70*
Workers of plantations	8.80*

* significant at 0.05 level

were used together in information dissemination process to increase the knowledge of the coconut cultivators (Lewis, 1984).

For further investigation, four kinds of models have been developed. They are models with three variable interactions. Here knowledge level of the small holders and perceived usefulness of two information sources have been tested. Log linear model (model with three interactions) of CATMOD has been used to do the analysis.

model 1: knowledge x EO/TSHDA x radio
df=1 G=0.16 p=0.92

model 2: knowledge x EO/TSHDA x neighbouring small holders
df=1 G=0.10 p=0.95

model 3: knowledge x EO/TSHDA x workers of plantations
df=1 G=0.04 p=0.98

model 4: knowledge x EO/TSHDA x news bulletins
df=1 G=1.56 p=0.46

The analysis of variance of the four models shows that the main models fit since the likelihood ratio tests for the three variable interactions are:

not significant. So by using the main effect models, we can describe the relationships. Although radio has no significant relationship with the level of knowledge of the farmers as an isolated source, the first model indicates that together with the other source(s), it shows a positive relationship. Above four models further stress that formal and informal sources when used together may help improve the knowledge level of the farmers.

Extension methods used and technical knowledge

It has been attempted to find out the association between interpersonal extension methods used by extension officers and the small holders' knowledge level. There are two kinds of interpersonal extension methods -- individual and group -- used by extension officers to disseminate extension messages. Each of these methods demands different approaches and techniques. So the two methods are suited to different purposes. It is important to consider the educational purpose of the extension work and to ensure that the method selected is used to promote the farmers' knowledge level. The extension officer therefore must think carefully about the use of individual or group extension methods either separately or together and ensure the increase of knowledge level of farmers.

The associations between six interpersonal extension methods used normally by extension officers of TSHDA and Tea Research Institute and the technical knowledge of small holders were examined by using chi-square analysis. These six methods were small scale farmer training classes, field days, individual visits, seminars, field demonstrations and exhibitions. Except individual visits, use of other extension methods had positive associations with the knowledge level of small holders (Table 3).

The extension officers of TSHDA make different kinds of individual visits to the small holders. They visit more for subsidy inspections than for extension work. The extension officer of TSHDA does an average of 67 individual visits to small holders per month. According to them, majority are subsidy inspections. The extension officers, however, indicated that when they visited for subsidy inspections, they also gave extension advices to small holders.

One of the possible explanations for lack of significant association between individual visits and knowledge of the small holders is that, as the individual advice is given to farmers during subsidy inspections, farmers receive it not as an advice, but as an order.

Table 3. Associations between extension methods used and technical knowledge of small holders.

Extension Method	Chi-square
Farmer training classes	19.15*
Field days	21.20*
Individual visits	8.73
Seminars	20.88*
Field demonstrations	19.24*
Exhibitions	20.77*

* significant at 0.05 level

CONCLUSIONS

Considering the three cultivation practices together, majority of the small holders (72.6%) have partial knowledge while 18.0 percent have full knowledge and 9.4 percent, no knowledge. However, 68.6 percent have full knowledge of pruning.

The very low knowledge level in pest and disease management may be related to the problem of identification of the symptoms. In most instances, symptoms are complex and exact identification is not easy. On the other hand, due to occasional appearance of the pests or diseases, knowledge gained, being not utilized may be forgotten by the farmer. Further, management practices are sometimes not adopted due to resource limitations. Such factors may result in lack of interest and finally lead to low knowledge level.

Low knowledge of fertilizer use is not only due to limitations of the information but also due to lack of interest caused by costly and scarce resources. On the other hand, in some areas like low country where there are high yielding opportunities, farmers apply over-doses and sometimes incorrect fertilizer mixtures (Use T-1130 instead of T-750).

Except age and type of employment, other socio-economic characteristics examined have positive associations with the knowledge level of the small holders. Knowledge level of the small holders is also associated with the type of information source used. Mainly farmers prefer combination of formal and informal sources. From formal sources they primarily get information which originates from research and with informal sources they share the practical experiences.

Except individual visits, use of other extension methods such as farmer training classes, field days, seminars, field demonstrations and exhibitions have positive associations with the knowledge level of the small holders.

This study shows that the information dissemination system of the tea small holdings sector and the level of knowledge of the small holders are interrelated.

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