

DEVELOPMENT OF PERFORMANCE INDICATORS AND STATISTICAL
TECHNIQUES FOR ANALYZING PARTICIPATORY RESEARCH IN SMALLHOLDER
RUBBER UNITS

By

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ABSTRACT

Smallholder sector of the rubber industry provides a considerable share to the national rubber production. Hence, it is a responsibility of the Rubber Research Institute to carry out research programmes to cater to the smallholder sector. Such studies are mainly survey based and participatory in nature and usually generate data that are both quantitative and qualitative. Such situations often lead to findings with inadequate statistical analysis and can result in ambiguous and biased interpretation of data. This study has emphasised on developing performance indicators for the smallholder rubber sector and use of proper statistical techniques for participatory studies.

Data collection for the study was based on a questionnaire survey carried out in the immature rubber holdings in the Kalutara district. An appropriate stratified sampling method was proposed and practiced employing information on subsidy payments as a proxy for overall adoption level. New improved clones, improved planting material, recommended application of fertilizer and recommended practices of weed control measures and cover crop management were considered as the technologies in this study. The impact of relevant socio economic variables on the adoption of fertilizer recommendation, cover crop management and weed control was studied using logistic regression approach. Level of education of smallholders plays an important role in the process of adoption in fertilizer application and cover crop management. The adoption rate of fertilizer application is low with females compared to males. This information is useful in planning effective extension programmes. The

survey highlighted that rubber smallholders are adopting different combinations of technologies and therefore, it is important to derive composite adoption indices.

A growth performance index (GPI) was developed in this study to monitor the status of growth in rubber lands. This index ranged from 0.39 to 2.13 and departed from the normal distribution. GPI had a positively skewed distribution and fitted best by the Beta type 2 distribution.

Yield data collected from 9 villages belonging to Kegalle, Kalutara and Ratnapura districts were employed in developing the yield performance index (YPI). For the 3 districts, the YPI followed a log-normal distribution.

The status of the holding is assessed in this study using a field assessment score (SCORE) which is made up of scores given for, four main field operations; land preparation, field establishment, ground cover management and other maintenance activities. Field assessment score followed a normal distribution with a mean value of 57.

Three adoption indices were developed in this study using the information collected during the questionnaire survey in the Kalutara district. For these indices, 5 components were incorporated; they were fertilizer application, cover crop management, planting material, clones and weed control. The index, I1 is a simple index giving equal weight to each component while the index, I2 is a weighted index based on scientists' and extension workers' experience. The other index, I3 was developed using the regression coefficients of each component when regressed with the dependent variable, GPI. The weighted indices had stronger relationships with GPI, suggesting that they are better than the simple index. All these indices did not depart from normality.

Different adoption categories were developed based on the quartiles of SCORE and I2 and the distribution of GPI for these adoption categories were studied. The 'high adopters' category followed a normal distribution while 'low' and 'medium' adopter categories followed a right skewed distribution which fitted well with the log-normal distribution.

Participatory Rural Appraisal (PRA) has gained a considerable importance in planning and decision support and has been successful in many occasions. This study has made attempts to find and illustrate appropriate statistical methods to suit frequently used PRA techniques. Illustrations are presented;

- (a) how pair-wise ranking matrices can be converted into binary scores and analyzed by the Kruskal-Wallis test,
- (b) analysis of preference ranking and matrix ranking exercises using Friedman's test,
- (c) checking the consistency of farmer groups using the Kendall's coefficient of concordance and
- (d) application of Bayesian Networks (BN) to interpret causal maps.