Quantification of causal maps using Bayesian Belief Networks (BBN): experiences from participatory rural appraisal (PRA) in smallholder rubber sector of Sri Lanka

W. Wijesuriya[1], A. Dissanayake[1] and M. Wijeratne[2]

[1] Rubber Research Institute of Sri Lanka, Dartonfield Estate, Agalawatta
[2] Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya

Abstract

In most of the research studies, which involve participatory techniques, much of the information gathered is of qualitative nature. Some of these will address specific research questions and some provides a general understanding of peoples' perceptions. This study was focused on the former. Researchers have emphasized that causal maps may be used as decision making tools in problem solving within the context of organizational intervention. BNNs are a one step ahead than analysis of causal maps in PRA. This can be used as a graphical decision support tool, which allows interactive investigation of different causes affecting a decision and their relative impact on the system as a whole. Participatory studies were carried out in 3 sites representing major rubber growing areas, namely; Kegalle, Kalutara and Ratnapura districts. The objective was to identify causes of low productivity in rubber lands and to identify effective responses through institutional interventions. The study employed BBN as a tool to make inferences on causal maps produced in farmer participatory studies. The software, Netica 1.2 was employed in developing the model and subsequent analyses. According to this BBN model, a considerable improvement in productivity can be obtained by awareness and skill development in all villages. Introducing rain guards will have a greater benefit in Kegalle area where the interference of rains is high, when compared to other sites. However, when both the responses are considered, the highest improvement can be gained in Batugampola in the Kalutara district, followed by Welihelatenna and Pohorabawa in Kegalle and Ratnapura districts, respectively.

Keywords: Participatory Rural Appraisal, Bayesian Belief Networks, Rubber, Smallholders