ABSTRACT

The present study has analyzed the huge farmer-level input-output data, related to cultivation of paddy-aman crop (*paddy grown during rainy season i.e. July to October*) by farmers of six villages in three different agro-climatic zones of West Bengal. These data were collected by IIT Kharagpur center of All India Coordinated Research Project on "*Energy Requirements in Agricultural Sector*" during 1987-2002. A well established and proven approach, Data Envelopment Analysis, is used for analyzing the data to unearth hidden and unknown relationships among the factors that could help to boost agricultural productivity.

A relational database has been designed and developed in '*MS-Access*' software to store data and retrieve them in desired forms. A Java-based GUI program is developed for retrieval to enable a novice user to retrieve the data in the desired form.

Data are analyzed, through analysis of variance (ANOVA), to study the temporal and spatial variations in yield and energy productivity. The results of ANOVA indicate that the yield and energy productivity values of different zones and during different rounds of surveys are significantly different. Multiple regression and structural equation modelling approaches are used to find causal relationships among input and output variables. The results have not been very satisfactory. A non-parametric approach has been adopted instead.

Data Envelopment Analysis, a non-parametric approach, is applied to estimate relative efficiency of each farmer, identify the peer-group for each inefficient farmer and to pinpoint their deficiencies. The best operating practices, if used as benchmark by the inefficient farmers, could help them to reduce the input needs substantially while maintaining the present yield. On an average, the savings could be achieved to the tune of 7-26 % for human, 10-20% for power tiller, 11-86 % for animal pair, 26-33% for Nitrogenous fertilizer, 11-20% for phosphoric fertilizer, and 39-45% for farm yard manure, if recommendations of the study are followed in different agro-climatic zones. The technological progress achieved by the farmers over time periods are also evaluated using the concepts of lagging and surpassing periods.

Key words: Relational Database, Structural Equation Modelling, Rainfed Paddy, Paddy Cultivation, Data Envelopment Analysis, Cross-efficiency Matrix, Technological Progress.