Efficiency Comparison of Farmer Field School Approach and Small Scale Irrigation Rehabilitation Schemes in Rain-Fed Farming in Kurunegala District

P.K.S. Madusanka and H.M.J. Rupasinghe
Department of Agricultural Economics and Business Management,
Faculty of Agriculture, University of Peradeniya, Sri Lanka

***Key words**: Technical efficiency, rain-fed farming, farmer field schools*

Introduction

Rain-fed farming is a backward production systems in Sri Lanka mainly due to water scarcity, low level of input and technology use associated with low productivity. A number of programs have been implemented by government agencies to upgrade the rural livelihoods under rain-fed farming through enhancing the agricultural productivity.Of these, the Dry Zone Livelihood Support and Partnerships Programof the International Fund for Agricultural Development aimed at raising upland farm productivity through two participatory extension methodologies. One is Farmer Field School (FFS) approach that promotes active participation of the beneficiaries in designing, implementation and monitoring of the interventions. The other is rehabilitation of small-scale irrigation schemes where small tanks wererehabilitated to provide irrigation facilities in the Maha season and to increase effective irrigated area of Yala season by around 30%.

Study Framework

The objectives of the study were to estimate and compare technical efficiencies of the farmers under these two programs. The necessary data were collected from a representative sample of 120 beneficiaries in Kurunegala District using a structured questionnaire. Galgamuwa, Mahawa and Polpithigama Divisional Secretariat Divisions (DSDs) were selected out of nine DSDs where the project was operational. Representative samples were drawn from the beneficiaries of Farmer Field Schools and Rehabilitation of small irrigation schemes from these selected DSDs.

Maximum Likelihood (ML) estimates of the of the stochastic production frontier functions as well as Ordinary Least Square (OLS) estimates of the average production functions were obtained under Cobb-Douglas specification using land, labour and material as inputs. Since the socio-economic context was similar, a common (i.e., pooled) frontier and individual frontiers were estimated and accordingly partial production elasticities, returns to scale parameters as well as technical efficiencies were

obtained. Appropriate statistical tests were employed to compare these estimates of the two project approaches with respect to the common frontier and individual frontiers.

Results

The results revealed that ML frontier functions were better representations of the production systems over OLS, implying that there were substantial inefficiencies in the system. The mean technical efficiency of the farmers under FFS approach was 88.78% while that for the farmers under small irrigation rehabilitation schemes was 83.42% with respect to individual frontiers. With respect the common production frontier, mean technical efficiencies of the farmers under FFS approach and small irrigation rehabilitation schemes were 88.28% and 87%, respectively. Therefore there is scope for further enhancing the output by 11.22 % and 11.72% with respect to individual and common frontier in Farmer Field School approach. Similarly, the scope for incremental output due to small irrigation rehabilitation schemes is 16.58% and 13% with regard to individual and common frontiers.

Output elasticities of FFS approach in terms ofland, fertilizer, seed and labour were 0.9964, 0.0286, 0.0441 and 0.0182 respectively. The elasticity values for land and seeds were statistically significant at P=0.05. Output elasticities of small irrigation rehabilitation schemes in terms of land, fertilizer, seed and labour were 0.1703, 0.7032, 0.2058 and 0.1188 respectively. However, only the elasticity related to fertilizer was statistically significant at P =0.05. Output elasticities of common scenario (FFS approach and small irrigation rehabilitation schemes combination) for land, fertilizer, seed and labour were 0.5347, 0.2534, 0.0066 and 0.0894; of these, elasticities for land and fertilizer were statistically significant at P = 0.05.

The mean technical efficiencies were statistically different between two schemes in the individual scenario, implying that farmers in FFS approach were more efficient within the individual scenario (T = 2.95, p = 0.004). The mean technical efficiencies were not statistically different between the two schemes in the common scenario indicating both approaches achieved similar efficiencies in that scenario.

There are long-term gains in rehabilitation of small scale irrigation schemes by helping farmers to overcome water scarcity in Yala season. On the other hand, in FFS approach, the water scarcity problem in the Yala season could easily be surmounted since the crop water requirement for other field crops such as ground nut is relatively low.

References

Chinwuba, P., and Emmanuel, O. (2006).Determinants of Yam Production and Economic Efficiency among Small-Holder Farmers in Southeastern Nigeria. Journal of Central European Agriculture, 7(2), 337-342.

Jondrow, J., Lovell, C.A.K., Materov, I.S. and Schmidt, P. (1982). On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Function Model. Journal of Econometrics, 23, 269–274.

Meeusen, W. and van den Broeck, J. (1977). Efficiency Estimation from Cobb-Douglas production functions with composed error. International Economic Review, 18, 435–444.

Thiruchelvam, S. (2005). Efficiency of Rice Production and Issues Relating To the Cost of Production in the Districts of Anuradhapura and Polonnaruwa. Journal of the National Science Foundation of Sri Lanka, 33(4), 247–256.

Tijani, I.A. and Aromolaran, A.B. Micro-credit and Technical Efficiency in Food Crops Production: A Stochastic Frontier Approach. (2009). Advances in Natural and Applied Sciences, 3(2), 156-165.