ECONOMIC CONSIDERATIONS FOR ZONING AS A PROCESS OF FLOOD PROTECTION IN BANGLADESH

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ABSTRACT

Bangladesh, a predominately agricultural country in the Third World, with 110 million people and only 9 million hectares of cultivable land, is known worldwide for its frequency of severe floods and other natural hazards like cyclones, tornadoes and epidemics. Increased pressure on the scarce land resources for food and habitation of the growing population is the main consideration for any agricultural project formulation. Successive development plans of Bangladesh have tried to address different socioeconomic problems by spreading limited available resources thinly over different sectors, although self sufficiency in food grain production has been targeted by politicians as well as researchers. Recently, the agricultural sector has planned for growth through the development of water resources management, in particular flood protection, as this is the primary source of all development activities in the country.

The decision making processes of farmer is taken as the main focus of this dissertation. Farming in Bangladesh, mostly for subsistence, may be a profitable or a losing concern, depending on the selection of the crop mix. In other words, farming depends on the decision making process of the farmers. The farm environment in a flood protected project area is described along with its agro-socio-ecological linkages. Flood mitigation literatures describing optimising crop mix technologies are reviewed. Theoretical details of different quantitative methods were brought together for the purpose of selection of an appropriate analytical model to capture the diversified nature of farming. The selection process utilised concepts, data and theories from relevant academic disciplines to find a model that could address a set of problems related to decision making at the grass roots level.

The empirical work of this dissertation is mainly based upon a survey of production relations in agriculture. The survey comprises randomly but purposively chosen farmer respondents within groups in order to capture a general picture of some agrarian relations for a specific flood control project - the Meghna Dhonagoda Irrigation Project.

A linear programming model was formulated. The coefficients of the model were estimated from the survey data. Given average resource endowments possessed by different groups of farmers, optimal cropping patterns for various situation were found. The model was run for five groups of farmers, under both with and without project conditions.

The results obtained from the model runs show that rice production in all farms increases by 140 to 383 percent. At the same time production of other crops diminishes significantly. The net year ending savings of group A (small) farmers decreases by 7 percent although their living standard is improved (indicated by increased family rice consumption and expenses). Group B (middle) farmers are in a slightly improved position, with a 1.5 percent increase in net year ending savings whereas the net year ending savings of groups C and D (large farmers) is doubled. The achievements of groups C and D compared to those of groups A and B shows the anomaly in welfare distribution of the public investments.

The impact on net return due to changes in resource endowments or crop coefficients is obtained from sensitivity and range analysis. It indicates the profitability or shadow cost for individual constraints.

Before implementation of the project, farmers often mixed different crops in the same field to reduce the risk if a particular crop failed. They grew a variety of staple crops and vegetables to meet family food needs and they rarely purchased artificial chemical fertilisers or pesticides. In other words, they were diversified and less susceptible to the natural disasters. After the project, farmers were much less diversified and used more artificial inputs.

Three significant features of the public investment in flood protection and irrigation arose:

a) Rapid economic growth, though with significant evidence of diminishing returns

b) Increased rice production at the expense of other crops

c) Unequal welfare distribution between rich and poor.

The results obtained through model runs conform to general trends. All available evidence indicates that past improvements to flood control and irrigation contributed significantly to the growth in agricultural production in Bangladesh. The complementarity between proven yield-increasing technologies and water application points out the importance of water resources development. Thus there should be no question about the desirability of flood control projects. But equitable distribution of facilities, or at least betterment of the majority of population, may not be achieved at the desired rate.