In this chapter, economics is regarded as the science of guiding managerial decisions oriented to prespecified managerial objectives. A socio-economic discussion of irrigation as a means for improving or stabilizing agricultural production requires such a broad definition because the decision-making unit can be a nation considering whether to commit its limited resources to irrigation projects as an instrument for promoting its national production, land settlement, or interregional development policies. Or, it can be an individual farmer considering whether to commit his limited capital and other resources to irrigation as a production practice. Complex technical, legal, and social problems are associated with irrigation in either case, and it is important to recognize that economic science does not require that they all be resolved within a strict monetary context.

Specific economic matters discussed in this chapter include: (i) The feasibility and profitability of irrigation as a production practice on individual farms; (ii) some general economic problems in irrigation project planning; and (iii) some special problems in multipurpose project planning. A concluding section deals very briefly with some current policy issues in irrigation as they relate to farm output requirements, farm production efficiency, and economic development in general.

I. ECONOMICS OF FARM IRRIGATION

Farm income is determined by many physical and economic variables, some of which relate directly to farm resources and others of which do not originate on the farm. Major on-farm variables are inherent soil productivity, the farm labor supply, general capital requirements for crop or livestock enterprises feasible in a locality, and the operator’s managerial abilities. Common external factors are weather, crop and livestock prices, and market costs of capital goods or other items used in production.

The effect on production of factors that might be controlled can be expressed in terms of an input-output function which relates physical output \( Y \) to inputs of variable resources or resource classes. The latter are stated in general as \( X_1 \) (land),...