

three headings: Program monitoring and evaluation, Socio-economic research, and Biological-physical research.

Program Monitoring and Evaluation

An experimental attitude should underlie every phase of the execution of the agricultural development program. Plans for the first one or two project areas must inevitably be based on the scanty sources of information now available, but one of the major missions of the early projects should be to provide sounder data for the guidance of later ones. They must be consciously organized to learn from experience.

The mission requires, fundamentally, that the effectiveness of all programs be carefully monitored. This is already being done in connection with the hydrologic program. Beginning even before physical improvements are installed, studies are being made of the inter-relationships of watertable level, canal leakage, evaporation, rainfall and soil salinity. But at the same time, reliable data should be gathered on farm budgets, crop yields, and the factors influencing them. Extensive farm surveys and crop-cutting measurements will be needed for these purposes.

As soon as the engineering works and agricultural improvement activities begin to go into effect the hydrologic changes caused by pumping, leaching, and cropping should be measured. The effects of the programs on farm incomes, cropping patterns, nutrition, morbidity rates, and the like should be measured frequently and the trends in crop yields should be observed. It is particularly important to monitor the effectiveness of the educational and agricultural extension phases of the work. Which devices for education and persuasion are most effective under the conditions of West Pakistan? What kinds of desirable change do the farmers adopt readily, and what kinds do they resist? What factors influence the farmers' readiness to adopt improved practice? How effective, in practice, are the credit and crop insurance aspects of the program? We need answers to all such questions for guidance in planning the subsequent project areas. In addition we need physical data on the responses of crops to nutrients, on the responsiveness of soils to treatments, on the hydrologic regime. Data obtained in the field by an integrated statistical monitoring system are essential to finding the answers to all such questions. Some data will be generated automatically as a by-product of project administration; other data (e.g. farm budgets, crop yields) must be obtained from carefully designed periodic sample surveys. The first few projects should, in short, serve as experimental regions for the benefit of