THESIS

APPLICATION OF INDUS BASIN MODEL TO GUGERA BRANCH CANAL COMMAND

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ABSTRACT

This study was undertaken to apply Indus Basin Model Revised (IBMR) to Gugera Branch Canal Command. The name of the model applied on the canal command is taken as Gugera Canal Model (GCM).The GCM model that is derived from the IBMR is a valuable research tool in investigating water-related projects and agricultural policies.

Among agricultural input data set, primary coefficients cover the cropping calendar, required inputs such as labor, draft power (bullocks and tractor) and crop water requirement, yield as proportion of standard technologies, crop technology were activated, ratio of straw and weeds yield, total digestible nutrients and digestible nutrients. All these data were based on the Extended Agricultural Economic Survey and Farm Re-survey, as incorporated by the World Bank and used as such. Secondary data were updated in the light of the information collected from different sources. This includes; fertilizer input, crop acreage, production and yield, livestock population, milk and meat production. The growth rate were based on the recent history for orchard area, fertilizer application, crop yield, livestock population, milk and meat production for the year 2005, 2010, 2015 ,2020 and 2025.

A substantial amount of efforts has been put into updating and validation of the model for base year (2000-01), latest year for which a comprehensive data base was available. When the model was first constructed, it was validated against the available data to ensure that it simulates the actual with respect to the critical variable and constraints pattern before it was used to simulate policy and project options. Once the model had been validated after the calibration exercise, it was used for future projection for the years 2005, 2010, 2015, 2020, and 2025. Data needed for the future run had been incorporated in the model.

Different scenarios were simulated including without and with project simulation scenarios. Under without project scenarios, the model was run without any change in the data, except the growth rates. Under with Project simulation two Plans were decided, in which, efficienscies of the watercourses and canal have been increased by 5% (Project

Plan-I and 10 % (Project Plan-II).The effects of additional water, due to improvement of efficiencies on the agriculture production have been studied.

Results of the simulation have shown that the areas of major crops will increase due to increase in availability of water. Production of these crops also increased accordingly. Total potential gain from the base year, under without project, increased by 8%, 16%, 25%, 32% and 38% for the simulated years of 2005, 2010, 2015, 2020 and 2025 respectively. Total potential gain increased by 10%, 17%, 26%, 33%, and 40% for the simulated years of 2005, 2010, 2015, 2020 and 2025 respectively due to Project Plan-I, whereas the potential gain increased, under Project Plan-II was 11%, 19%, 27%, 35% and 42% for the simulated years of 2005, 2010, 2015, 2020 and 2025 respectively. Further the Results also show that reduction in economic costs of inputs were more due to Project Plan-II than the Project Plan-I.