INNOVATIVE INITIATIVES IN WATER STRESSED AREA BY EFFECTIVE MONITORING OF CANAL OPERATIONS

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1. Introduction

Introduction to Punjab Irrigation System

❖ Rotational plans are made on 8 days rotation of the canals
❖ Rotational Plans are made on division level on season wise (Rabi and Kharif)
❖ In the 1st priorities canals run on their design discharge with (+10% of the design discharge) variation
❖ 2nd and 3rd priority channels run as per water availability in the parent channel
❖ Rotational plans are strict and cannot be violated.

2. Policy

Challenges of Water

Historical Water Availability (1960–2016), Withdrawals (1975–2016), and Consumption (1975–2016); and Projected Availability and Demand to 2047

Source: On-Farm Water Management (OFWM) Department
Source: GoP 2017 and author calculations.

3. Issues in Punjab Irrigation System

❖ Supply driven rather than demand led distribution of water without considering cropping pattern
❖ Inequity of irrigation water at both inter and intra provincial level and water course level
❖ Deferred operation and maintenance of centuries old irrigation system
❖ System losses as high as 55%.
❖ Lack of water conservation and application techniques at the farm level

4. Approach to Modernization

Project Information
Implementation of modernization proposal
Lessons learnt including benefits from modernization

5. Future Directions

Implementation of modernization proposal
Lessons learnt including benefits from modernization

6. Programme Monitoring & Implementation Unit (PMIU)
Punjab Irrigation Department

Mangla Reservoir Storage Capacity = 7.356 MAF
Tarbela Reservoir Storage Capacity = 6.101 MAF
Chashma Reservoir Storage Capacity = 0.3482 MAF

Outlines

Introduction
Introduction to Punjab Irrigation System
Issues in Punjab Irrigation System
Policy
Challenges of Water
Challenges of Food Security
Approach to Modernization
Project Information
Implementation of modernization proposal
Lessons learnt including benefits from modernization
Future Directions
Policy: Challenges of Food Security

I. Pakistan is a low-income country abundant with natural resources.

II. Agriculture is the most important sector of the country meeting food requirements of the fast-growing population.

III. According to several studies conducted by Sustainable Development Policy Institute Pakistan (SDPI), the district facing the governance issues are worse affected by food insecurity.

Values which are less than 1300 m³/capita/year are in deficit (Source: Rockstrom et al. (2008) cities in Falkenmark, etc. (2009))

Project Information

Improvement and Modernization of the Irrigation and Water Management System under the components B-1

Task-A: Review / upgrading of Water Resources Management Information System (WRMIS) and integration with Decision Support System (DSS).

Task-B: Hydrological Modelling for Forecast of Water Availability and Determination of Punjab’s Share.

Task-C: Development of a Real-Time Operations Model.

Task-D: Determination and Mapping of Water Table Fluctuations.

Task-E: Development of Hydraulic Models of all Main and Branch Canals of Punjab Irrigation System.

Project Information

Improvement and Modernization of the Irrigation and Water Management System under the components B-2

Real Time Flow Monitoring System (RTFMS)

Real Time Flow Monitoring System

Benefits:

➢ Control on theft of water.
➢ As RTFM System is without human interruption so any change in flow of water in distributaries/ canals is immediately automatically reported to head office.
➢ Monitoring of violation of Rotational Program 24/7.
➢ Transparency in water distribution.

Webbase Server for RTFMS

Implementation of Modernization (GIS Approach)

Implementation of Modernization (Water Resource Management)

Modern Approach (ADCP) for discharge measurement
Lessons learnt including benefits from modernization

- Satellite data based forecasting is most useful for forecast of water availability at rim stations.
- Monitoring of violation of Rotational Program 24/7 using RTFMS.
- Real Time Crop water Module is very useful for ensuring the equity at dity level.
- Hydraulics models for canal is helpful for canal operator to ensure the water at tail level.
- Transparency in water distribution.
- Modern Database: Redesigning of existing and proposed data models for efficient storage and retrieval of data for various functional requirements.
- Modern Web-Application: Redesigning of existing IMIS system by incorporating additional functionalities to automate the business process.

Way Forward

1. Integration of all the models for Decision Support System (DSS)
2. Cost sensors both for surface and GW in the future coming projects
3. Water budget estimation to distinguish consumption of irrigation water, groundwater and rainfall using GIS and Remote Sensing technique

Future Directions

I. Integration of all the models for Decision Support System (DSS)
II. Cost sensors both for surface and GW in the future coming projects
III. Water budget estimation to distinguish consumption of irrigation water, groundwater and rainfall using GIS and Remote Sensing technique

THANK YOU