Report on Best Practices being followed in Water Resources/Irrigation – SCADA – Narayanapur Left Bank Canal, Karnataka

1. Introduction

Narayanapur Left Bank Canal (NLBC) is the biggest & main artery of Canal network under Upper Krishna Project designed for a carrying capacity of 10,000 cusecs of water to irrigate 4.5 lakh ha of command area in drought prone districts of Northern Karnataka. The distribution network under NLBC includes Main/Branch canals, distributaries laterals and sub lateral systems there under.

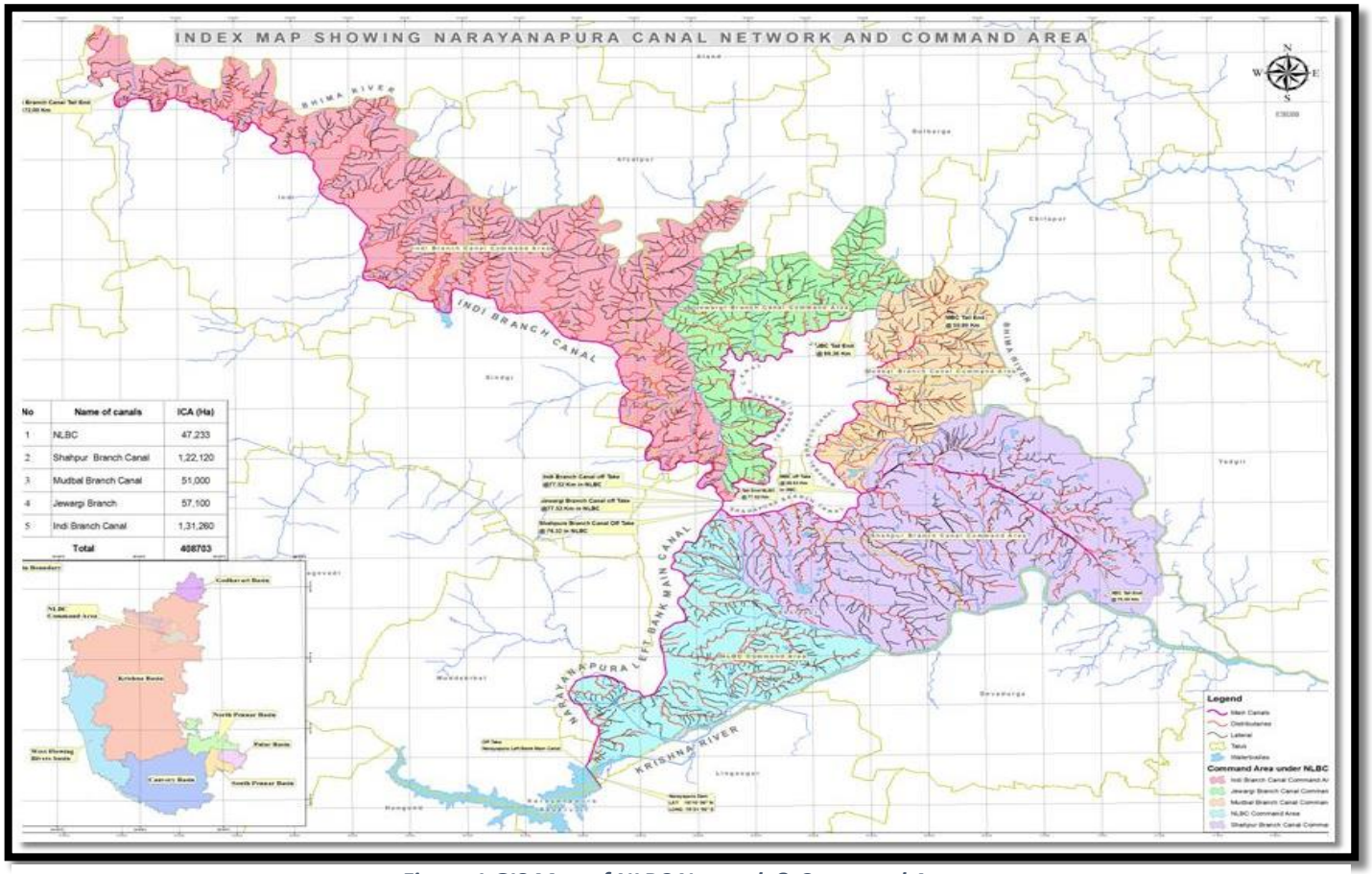

Figure 1 GIS Map of NLBC Network & Command Area

For improving water use efficiency, major initiatives taken by Karnataka state are

- Adoption of Micro Irrigation (Drip & Sprinkler irrigation)
- Modernisation of canal system & SCADA based automation
- Canal Top solar power project

2. Need for NLBC – SCADA Automation

The main objective of National Water Mission is "Conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within states through integrated water resource development and management". As a sequel to the policy of the GOI, a comprehensive Strategy Plan was worked out by Krishna Bhagya Jala Nigam Limited (KBJNL) to improve water use efficiency by 25% in Narayanapur Left Bank Canal System of Upper Krishna Project through TOTAL SYSTEM IMPROVEMENT.

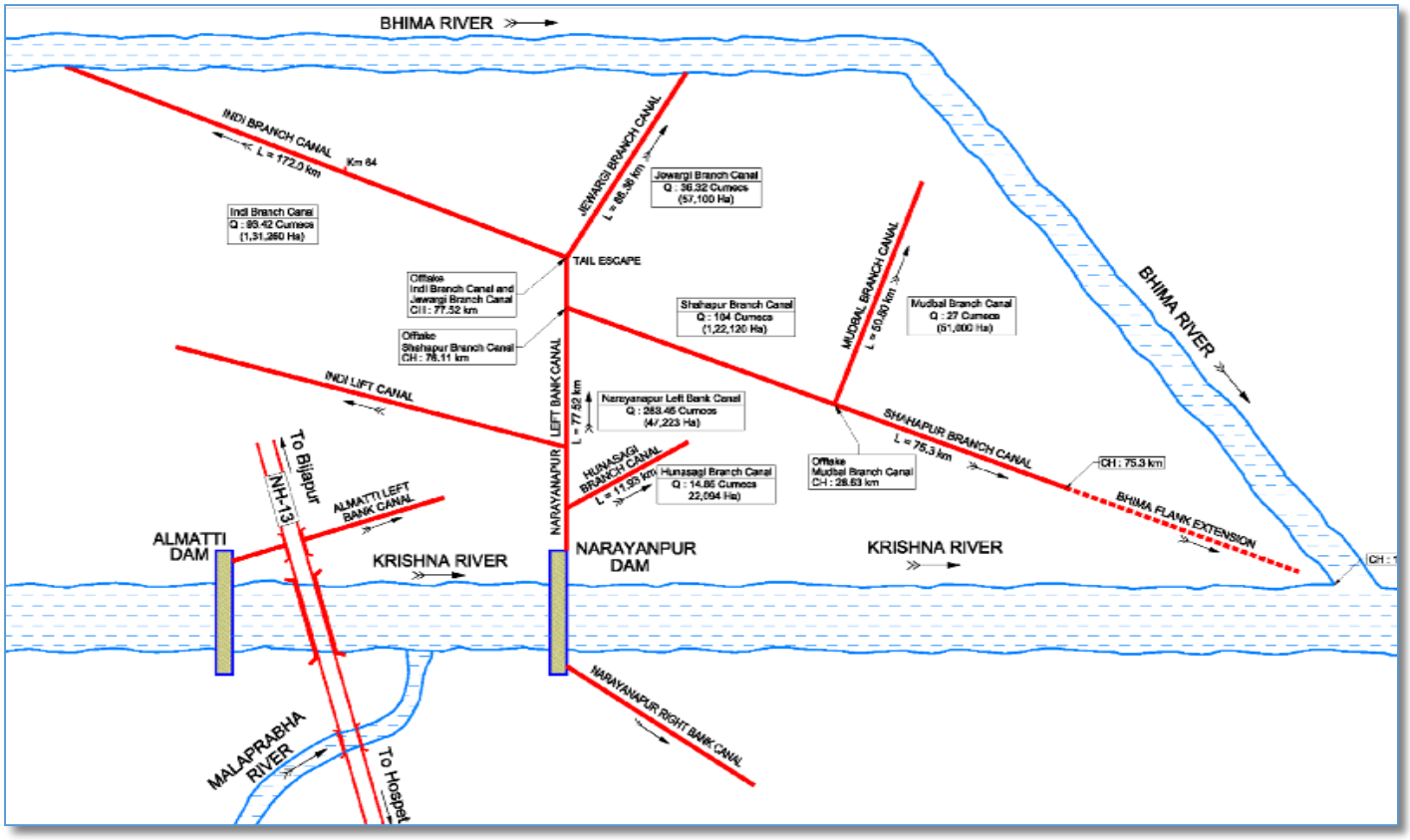

Figure 2 Key Index Map of NLBC Canal System

3. Existing Scenario

The deficiencies in the command area of NLBC have resulted in the following:

- Suffering Atchkut of 1,05,623 ha
- About 37,000 ha of water logged, saline/alkaline affected areas.
- Poor Water use efficiency (WUE) of 31.75% against design efficiency of 51%.

Through remodelling of existing canal system, conveyance efficiency is improved. Adopting SCADA based automation and GIS innovative technology for efficient water management.

4. How SCADA improves the water use efficiency

- Makes the canal systems more efficient, responsive, flexible, cost effective and safe.
- The canal automation project is to increase the water use efficiency in the network, as it not only empowers the management to accurately control the flow through gate operation, it also accepts the responsibility of automatically controlling the canal network even in the absence of operators.
- Canal Automation aims at sharing of water timely, judiciously, equitably and efficiently among the farmers/stake holders in command area and reduction of losses. Improvement in the efficiency of the system results in saving of water leading to increases in command area & crop productivity.

- A centralized audit system is providing excesses, deficits and corrective measures taken in canal network. Water accounting and auditing is facilitated by establishing flow measurement devices.
- By comparison of water use in volumetric terms per hectare by the distributaries and the defined boundaries, it ensures balanced or optimum utilization per hectare across the command area.
- The systems are designed to react to imbalance in the canal network due to natural or human disturbances.

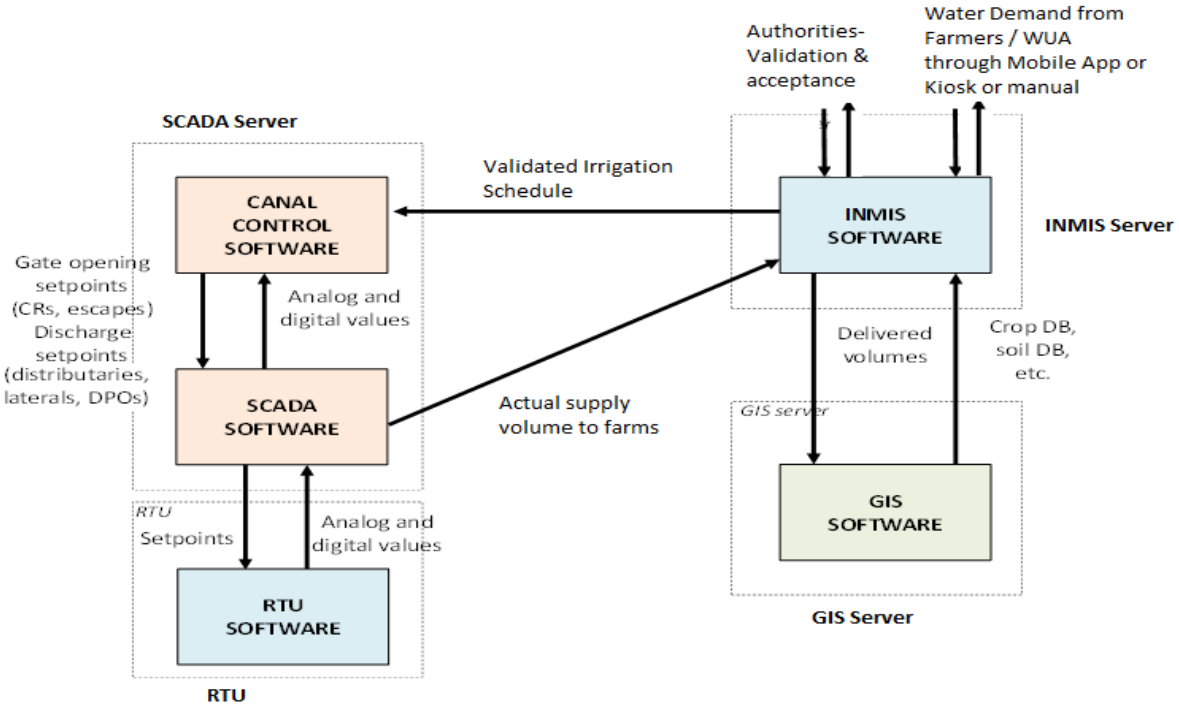

Figure 3 Overall Architecture of the Project

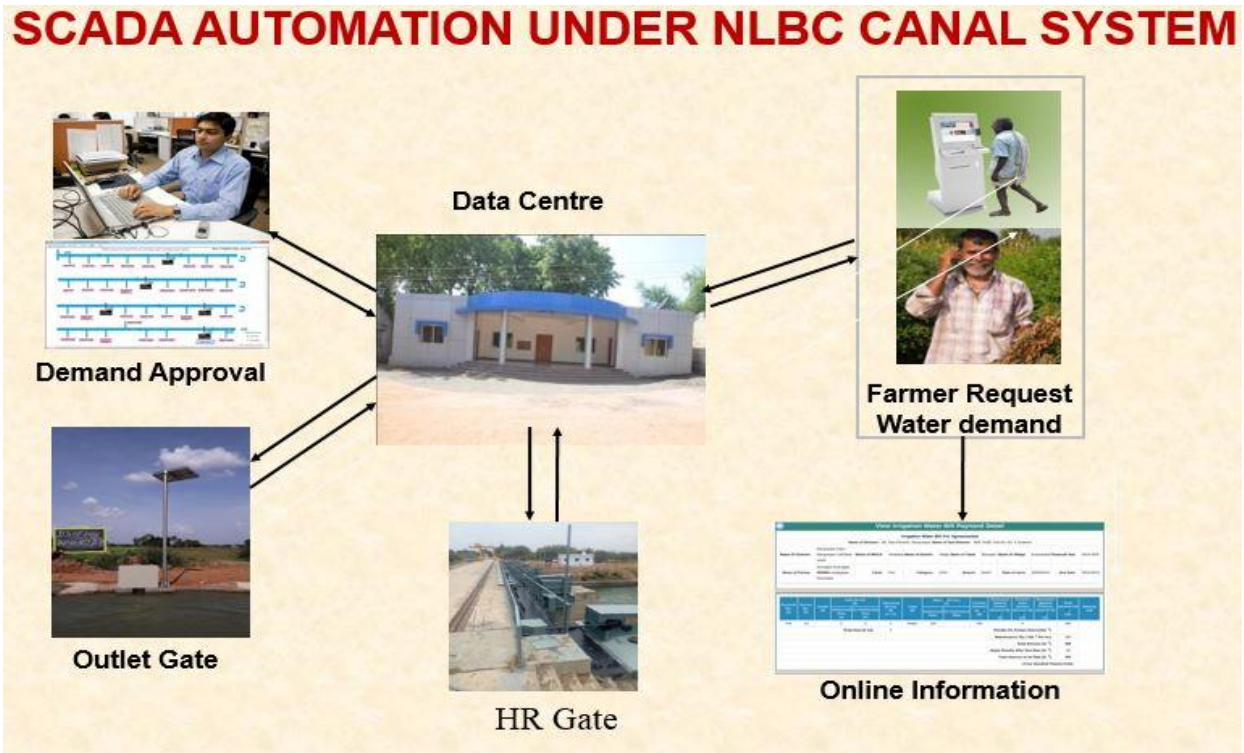

Figure 4 SCADA Automation

Advantages of SCADA & Instrumentation

Real Time Operation	Real Time Data Monitoring/control facility from SCADA control room
Reliability	Real Time data acquisition on 24/7 monitoring & control
Remote Operation	Remote Operation of Electrical/Mechanical Equipment
Efficiency	Allows Efficient Monitoring & Planning for future
Cost Reduction	Power/Energy savings & reduction in operation/maintenance costs
Response Time	Fast Response time for control during emergency condtions
Report Generation	Automatic daily/weekly/monthly/annual report generation
Billing	Accurate & Automatic Billing

Figure 5 Installation of Fully Integrated Gates

5. *Benefits of the Project*

- Water delivered to the tail end users suffering Atchkut area
- Increased the water use efficiency in the network
- Automatic control of the canal network possible in the absence of operators
- Water distribution has been done judiciously, equally and efficiently among the farmers/stake holders in command area
- Reduction in water loss
- Increased crop productivity at tail end
- Increased Irrigated area
- Water auditing & accounting
- Online water demand, water billing & Revenue generation

6. *Summary*

This is first of its kind project taken up for implementation by KBJNL in Karnataka State which will result in effective conservation of water, minimizing wastage and ensuring its more equitable distribution of water in the entire NLBC Canal Network System. Based on the performance, thereupon the SCADA System will be scaled up to other Branch Canals & Distribution Network under NLBC Canal System.