



# **AUTOMATED SYSTEM FOR IMPROVEMENT IN IRRIGATION AND ENERGY EFFICIENCIES: A STUDY ON NARAYANPUR LEFT BANK CANAL, KARNATAKA, INDIA**

**Theme: Water Conservation and Rain Water Harvesting**

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**Managing Director**

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Hydrology Expert



## **Mechatronics Systems Pvt. Ltd.**

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URL: [www.mechatronicspune.com](http://www.mechatronicspune.com)

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Flood Forecasting & flood  
Management System with  
Dam Automation

Canal Automation &  
Smart Irrigation  
Management System

Smart City Water  
Supply  
Management

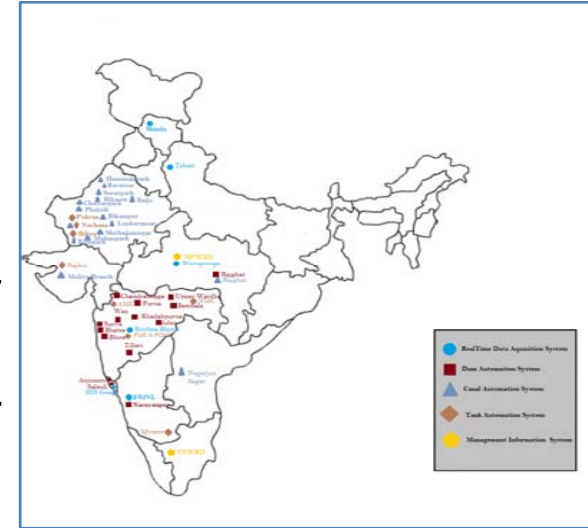
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## About MECHATRONICS Systems Pvt. Ltd.

- Mechatronics, established in 1991 to provide complete solution for efficient water resource management system (IWRM) means *from first drop of rain to the end water user*. is now proudly holding **CMMI 3** certification for software, **ISO 27001-2013**, **ISO 14001-2015** and **ISO9001:2015** quality certification, offering **Truly Indigenous, 100% Made in India**, state-of-art, Smart Digital solution for integrated water resource management.



- Robust and time tested products, solutions and services has earned Mechatronics, many a laurels from customers worldwide.
- A strong team of 200 professionals comprising of software engineers, hydrologists, electronics and instrumentation engineers, business graduates, installation and commissioning engineers having interdisciplinary experience.



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**Real Time Hydro  
meteorological  
information  
systems**

**Flood forecasting, Early  
Flood warning and flood  
management systems with  
Dam/Reservoir Automation**

**Canal Automation and  
GIS based Smart  
Irrigation Management  
Systems**

**Smart City Water  
Supply Management**



**Artificial Rainfall  
using ION  
seeding**

**Geographical  
Information  
System (GIS)**

**Enterprise Management  
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**Smart Phone  
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## A STUDY ON NARAYANPUR LEFT BANK CANAL, KARNATAKA, INDIA

### Introduction

- Canal automation is a combination of technical, managerial, and organizational upgrading of irrigation schemes with the objective to optimise resource utilization (water, manpower, energy etc.) and water delivery service to farms.
- Encouraged by ongoing drive of Gol for water conservation and integrated management of water, KBJNL implemented a GIS based automatic operations of the Narayanpur Left Bank Canal (NLBC) network.
- **Adequate quantity of water can be provided timely, equitably, judiciously which leads to reliability and flexibility of implemented GIS based smart irrigation system.**



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## Narayanpur dam with NLBC command area



**Krishna Bhagya Jal Nigam LTD.**



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## Implemented GIS based Smart Digital Irrigation System

Sr. No.	Description	Qty
1	Total Command Area	4.86 lakh ha
2	Total canal length	7408 km
3	Total Villages	620 nos.
4	Total Farmers (RTC Data)	309244 nos.
5	Total Parcel data	96368 nos.
6	Total Soil health card	278000 nos.
7	Information Kiosk	210 nos.
8	Monitoring station	10 nos.
9	Integrated gates	365 nos.
10	Existing Weather Station in Command area	8
11	Existing Rainfall station in command area	33



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## Pre-implementation Scenario



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## Way Forward .....

- Waking up to Information Technology & Digital World
- Adopting ICT and Digital technologies as they have already entered every sphere of human endeavor.
- Thinking beyond Dams, Canals, Ponds, Pipes and Processes
- Thinking out of the Box and beyond the “Tried and Tested” approaches of past
- Welcoming a New approach characterized by Real Time Data Driven Decision Making and Automated Field Operations
- Adapting a New Style of Management encompassing a wide variety of Management Tools and Decision Support Systems





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## The Solution

To overcome the shortcomings in present WRM scenario, it becomes necessary to use ultra-modern digital technologies for real-time monitoring and control of water resources by deploying

- GIS based Enterprise Information Management will provide real-time information & data to managers,
- Smart weather, level, rainfall and flow measurement systems,
- Dam and canal automation systems,
- Judicious and equitable Water distribution through smart integrated Water Supply operations,
- IT hardware and communication devices for remote data,
- Judiciously distributing water to every farm by using the data generated by Geographical Information System (GIS),
- Soil Health surveys and associated with INMIS.
- Farmer Information Kiosk / Smart phone app



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## Hon'ble Prime Minister's Vision



Inspired by Hon. Prime Minister of India's dream vision of establishing farmer focused, sustainable, smart, digital, indigenous (made in India) water resource management information system.



We have developed GIS based Smart Integrated Water Resource Management & control system comprising Enterprise Management Information System (EMIS) & water SCADA provides strong base for agricultural development which in turn will boost Indian economy.



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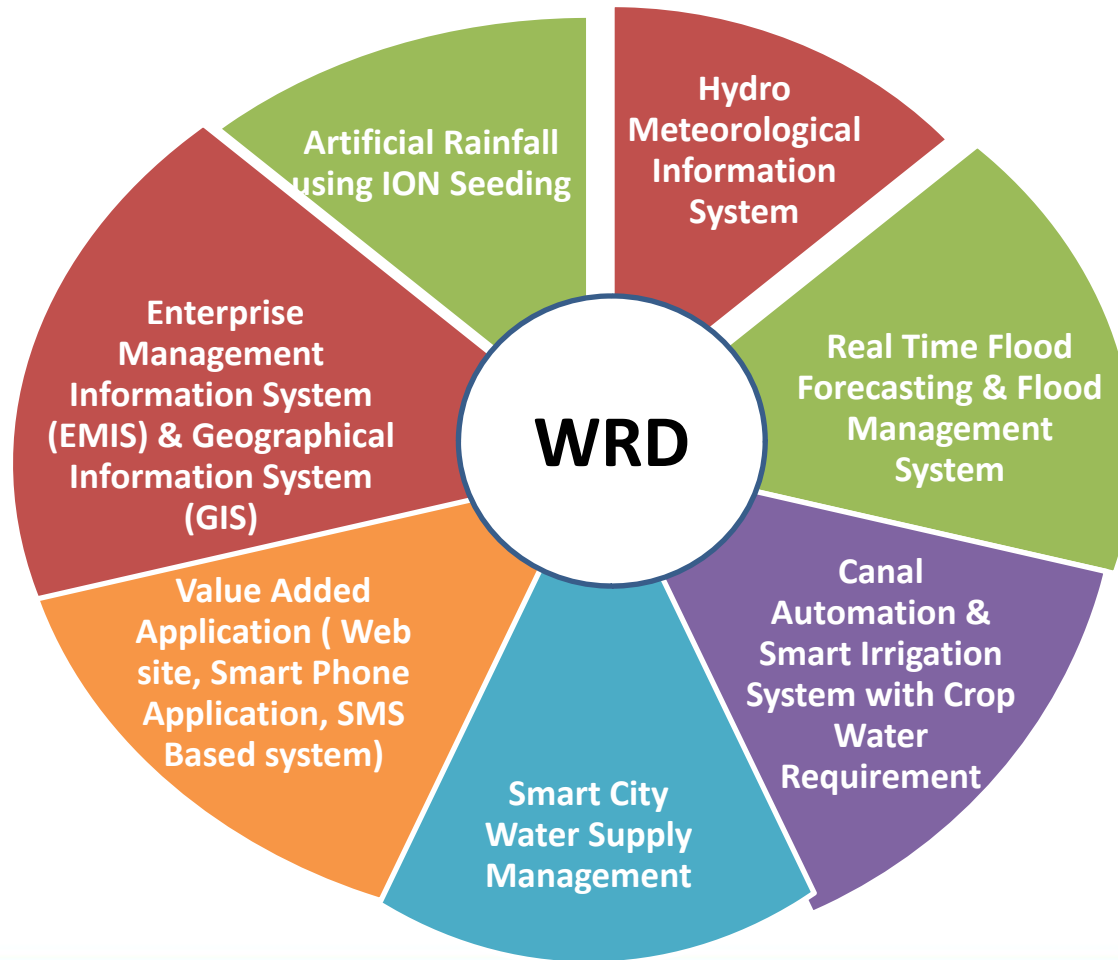
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## Total Digital Smart Solution



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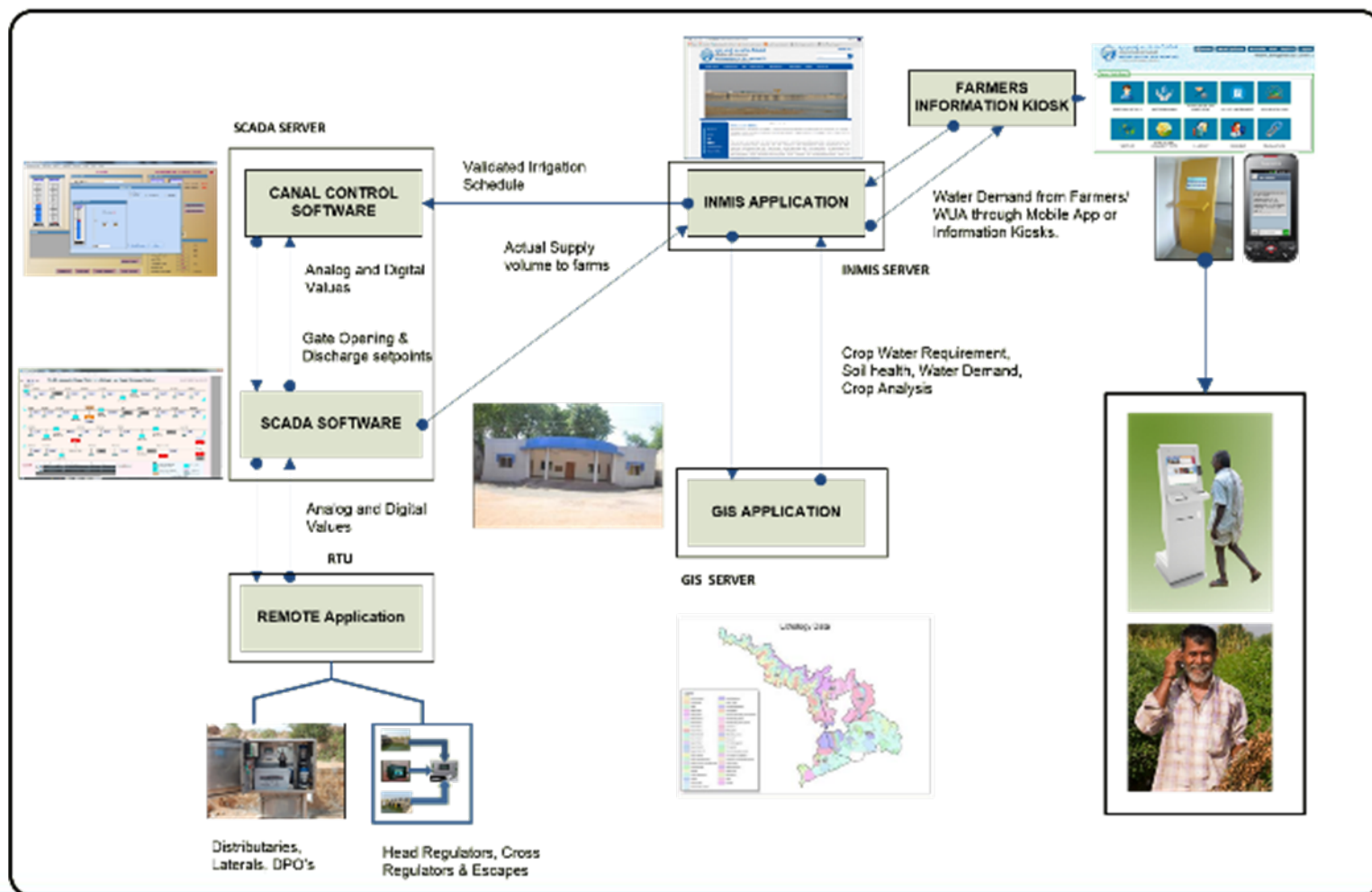
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## NLBC CANAL AUTOMATION – Overall Architecture



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## Farmer Dash Board

Crop Revenue Application ▶ View Farmer

[View On GIS](#)

[Back](#)

### Personal Details



Name of Farmer (In English)	Mahammad	Father/Husband Name (In English)	Husensab Kazi
Name of Farmer (In Kannada)	ಮಹಮ್ಮದ್	Father/Husband Name (In Kannada)	ಹುಸೇನ್ ಸಾಬ್ ಕಾಜಿ
Contact No.	9972679463	Email ID	Not Available
Address	Balshattihal, Taluk: Shorapur, District: Yadgir	Aadhaar Number	713433190948
Caste	Muslim		

### Farmer Land Details

[Change Owner](#)

Survey No.	55/*/*		
Total Area (In Ha)	3.95	Total Area (In Acre:Guntha)	9:35
Latitude [Deg:Min:Sec]	16:23:15	Longitude [Deg:Min:Sec]	76:29:49

### Office Details

Name of Zone	CE, O and M Zone, Narayanpur
Name of Circle	SE, O and M Circle No. 1, Narayanpur
Name of Division	EE, Dam Division, Narayanpur
Name of Sub-Division	AEE, NLBC Sub Div. No. 4, Kodekal

### WUCS Details

Name of WUCS	Balashettihal		
President Name	Hanamanta Banddi	Contact No.	9900666636
Secretary Name	Mahammad Kazi	Contact No.	9972679463

### Water Source Details

Name of District	Yadgir	Name of Taluk	Shorapur
Name of Village	Balshattihal		
Canal	Hunasagi Branch Canal of NLBC	Distributary	D4 of HBC
Lateral	Not Applicable	DPO/Outlet	DOR-2

- [Soil Health Card](#)
- [View Water Demand](#)
- [View Bill](#)
- [Irrigation Schedule](#)



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## State level commodity rates

Markets Reported For 19/08/2019: 0

Crop	Minimum Price (In ₹)	Maximum Price (In ₹)
Cereals		
Wheat		
Bansi (*)	1650	2800
Sona (*)	1400	2500
Red (*)	2200	2600
White (*)	1465	2357
H.D.(*)	1550	1650
Local(*)	1520	3200
Medium(*)	2600	3100
Mill Wheat(*)	4000	4100
Sharabathi(*)	1450	2750
Other(*)	1720	2670
Paddy		
Paddy(*)	1000	2400

## Weather Details

**Weather Details**

**Weather Details (Shorapur)**

Today	Time	Temperature	Wind Speed	Wind Degree	Cloudiness	Pressure	Humidity
26/12/2017	7:22 am	19.9 °C	1.96 m/s	53.0006°C - East-NorthEast	clear sky	981.05 hpa	65%

**Forecast Details**

27/12/2017	8:30 am	15.45 °C	3.46 m/s	41.5021°C - North-NorthEast	clear sky	980.92 hpa	60%
27/12/2017	5:30 pm	26.36 °C	3.17 m/s	74.002°C - East-NorthEast	clear sky	976.63 hpa	25%

\* All the Data Shown From Url - <http://openweathermap.org/api>

Quick Weather Details

Weather Details

**BELAGAMI**  
TEMP RANGE: 8.40(°C) TO : 21.30(°C)  
HUMIDITY RANGE: 61(%) TO : 93(%)  
WINDSPEED RANGE : 0(m/s) TO : 1.10(m/s)

**BENGALURU RURAL**  
TEMP RANGE: 14.20(°C) TO : 17.40(°C)  
HUMIDITY RANGE: 93(%) TO : 100(%)  
WINDSPEED RANGE : 0(m/s) TO : 0.60(m/s)

**BANGAL (IRRI) HIRRAH**  
**Rainfall Details**  
RANGE: NO RAIN  
TOTAL RAIN : NO RAIN

**BENGALURU URBAN**  
RANGE: NO RAIN  
TOTAL RAIN : NO RAIN

**BIDAR**  
RANGE: 0(mm) TO: 0.50(mm)  
TOTAL RAIN : 0(mm)

**CHAMARAJANAGARA**  
RANGE: 0(mm) TO: 2(mm)  
TOTAL RAIN : 0.50(mm)

\* All the Data Shown From Url - <https://www.kandmc.org>

## Help-Desk

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**Support Timing :**  
10:00 am to 7:00 pm

**Email us :**  
inmishelp@kbnl.gov.in


**INMIS - Support Center :**  
Main SCADA Center,  
Manoranjan Kendra, Narayanpur.


**Office Address :**  
PWD Office Annexe, III Floor,  
K.R.Circle, Bangalore - 560 001.


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**E - LIBRARY**


**Books: In English**


  
⇒ [Agriculture Food and Water](#)


  
⇒ [Agriculture In India](#)

  
⇒ [Sustainable Agricultural Practices](#)


**Books: In Hindi**


  
⇒ [परिणाम खेते](#)


  
⇒ [कृषि मेला](#)

  
⇒ [आर्टिकल- कृषि बीमा](#)

**Books: In Kannada**

  
⇒ [ಸಮಯದ ಅನಂದ ಬಳಕೆ](#)

  
⇒ [ಸಮಯದ ನಳ ಬೆಳೆಸಿ](#)

  
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## Soil Health Card Details [2015-2016]

<b>Name of Project</b>	Design, Manufacturing, Supply, Installation, Operation and Maintenance of Phase I of SCADA based automation and GIS system for NLBC Network		
<b>Name of Organization</b>	Krishna Bhagya Jal Nigam Limited		
<b>Name of Farmer</b>	Mahammad S/D/W/o Husensab Kazi	<b>Land Survey No.</b>	55/*/*
<b>Total Area(In Ha)</b>	3.95	<b>Name of Village</b>	Balshattihal
<b>Name of Taluk</b>	Shorapur	<b>Name of District</b>	Yadgir
<b>Sample UID</b>	Balshattihal/328	<b>Lab Testing Model No.</b>	AB/SL/Balshattihal/328
<b>GPS Coordinates</b>	Lat-16:23:15 Long-76:29:49		

### Soil Test Report

Test	Normal Range	Value	Micro Nutrients	Value
pH Content	6.5-8.0	6.72	Copper [Cu] ( $\mu\text{g}/\text{kg}$ )	148.3
Salt Content [EC] (dS/m)	1.0dS/m	0.592	Iron [Fe] ( $\mu\text{g}/\text{kg}$ )	81.12
Available Nitrogen [AVN] (kg/acre)	280-560	475	Sulphur [AS] (mg/kg)	2707.11
Organic Carbon [TOC] (%)	0.5-1.0	0.56	Manganese [Mn] ( $\mu\text{g}/\text{kg}$ )	0.8
Available Phosphorous [AP] (kg/acre)	22.9-56.3	22.57	Zinc [Zn] ( $\mu\text{g}/\text{kg}$ )	47.24
Available Potash [AK] (kg/acre)	140-336	160.1	Boron [B] ( $\mu\text{g}/\text{kg}$ )	38.12
			Molybdenum [Mo] ( $\mu\text{g}/\text{kg}$ )	1.51

**0.278 million nos. of Soil Health Card Distributed within the NLBC Command Area**



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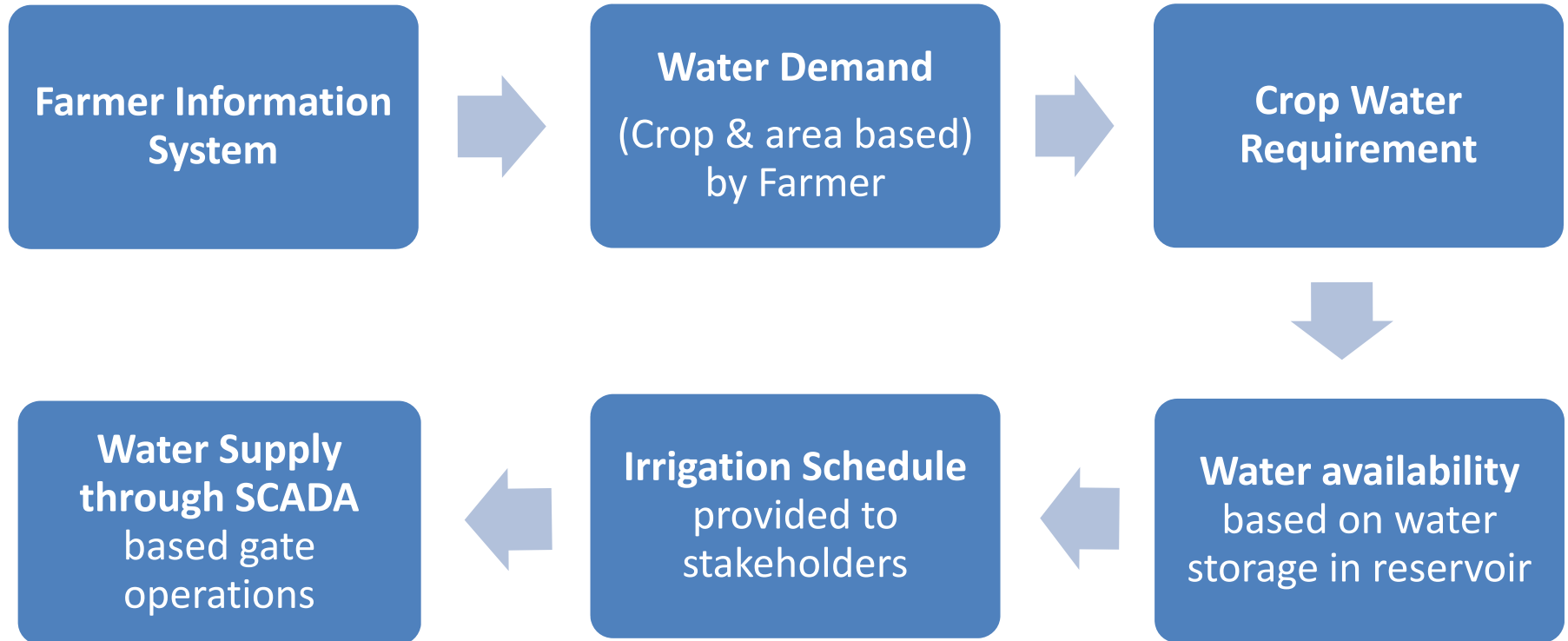
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## Water Demand and Supply Flow





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## Water Demand from Farmer

Crop Revenue Application ▶ Water Demand Details

Back		Water Demand Details			
Name of Farmer	Mahammad	Father/Husband Name	Husensab Kazi		
Name of District	Yadgir	Name of Taluk	Shorapur		
Name of Village	Balshattihal	Survey No.	55/*/*		
Total Area (In Ha)	3.95	Total Area (In Acre:Guntha)	9:35		
Season	Financial Year	Water Demand Details		View Water Demand	
		No.of Crops	Demanded Area (In Ha)		
Kharif	2016-2017	1	3.84	<a href="#">View Water Demand</a>	
Rabi	2016-2017	1	3.84	<a href="#">View Water Demand</a>	
Kharif	2015-2016	1	3.84	<a href="#">View Water Demand</a>	
Kharif	2017-2018	1	3.73	<a href="#">View Water Demand</a>	
Rabi	2014-2015	1	3.64	<a href="#">View Water Demand</a>	
Kharif	2014-2015	1	3.84	<a href="#">View Water Demand</a>	
Rabi	2017-2018	1	3.84	<a href="#">View Water Demand</a>	
Rabi	2015-2016	1	4	<a href="#">View Water Demand</a>	
Kharif	2018-2019	1	3.8	<a href="#">View Water Demand</a>	
Kharif	2019-2020	1	3.8	<a href="#">View Water Demand</a>	

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Back		View Water Demand For RABI (2017-2018)			
Name of Farmer	Mahammad	Father/Husband Name	Husensab Kazi		
Name of District	Yadgir	Name of Taluk	Shorapur		
Name of Village	Balshattihal	Survey No.	55/*/*		
Total Area (In Ha)	3.95	Total Area (In Acre:Guntha)	9:35		
Crop	Demanded Area (In Ha)		Date		
Paddy	3.84		21/11/2017		

Back		View Water Demand For KHARIF (2019-2020)			
Name of Farmer	Mahammad	Father/Husband Name	Husensab Kazi		
Name of District	Yadgir	Name of Taluk	Shorapur		
Name of Village	Balshattihal	Survey No.	55/*/*		
Total Area (In Ha)	3.95	Total Area (In Acre:Guntha)	9:35		
Crop	Demanded Area (In Ha)		Date		
Paddy	3.8		11/07/2019		



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## Crop Water Requirement of particular crop

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Search Water required

Financial Year \*

Crop Name

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### Search Results

Structure Name	Season	Crop Name	Financial Year	January	February	March	April	May	June	July	August	September	October	November	December	
OR-2	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
DPO-3	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
OL-2	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
OL-4	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
DOR-7	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OR-4	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
OR-11	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OL-1	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
PO-1	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OR-2	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
DPO-5	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OL-6	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OR-1	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
OL-1	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OL-6	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OL-7	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OL-4	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
OL-3	Kharif	Paddy	2017-2018	0	0	0	0	0	0	28.0447171712	55.6258573847	43.7873164276	54.8270839424	31.9349518429	6.1327295651	18.4612195375
OL-4	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	
DOR-4	Rabi	Paddy	2017-2018	0	0	0	0	0	0	0	0	0	0	0	0	

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Hydro  
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Information  
System

Flood Forecasting & flood  
Management System with  
Dam Automation

Canal Automation &  
Smart Irrigation  
Management System

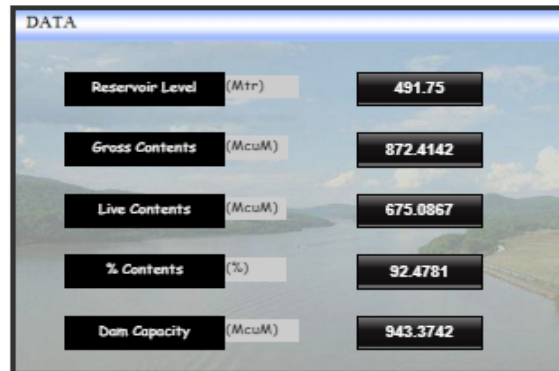
Smart City Water  
Supply  
Management

Geographica  
l Information  
System

Enterprise Management  
Information  
System(EMIS) & E  
Governance

Smart  
Applications

## Water availability based on water storage in reservoir



### Last 7 Days Data:

Date	Dam Level (Mtr)	Gross Contents (McuM)	Per Contents (%)	Live Contents (McuM)
21/08/2019	491.83	884.8217	93.7933	685.2552
20/08/2019	491.94	897.7569	95.1645	699.4138
19/08/2019	491.70	871.7893	92.4118	668.7579
18/08/2019	491.43	835.3639	88.5506	635.6017
17/08/2019	491.09	789.5373	83.6929	595.7515
16/08/2019	489.77	649.6357	68.8630	453.0603
15/08/2019	489.44	619.3090	65.6483	419.8145
14/08/2019	489.49	619.7948	65.6998	424.7204



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## Irrigation Schedule managed by KBJNL Authority

Crop Revenue Application > Create Irrigation Schedule

[Back](#) Create Irrigation Schedule

Year	2019-2020	Child 1	Hunasagi Branch Car
Parent*	Narayanpur Left Banl	Child 3	DOR-2
Child 2	D4 of HBC	Child 5	
Child 4	No Distributary Foun	Child 7	
Child 6		Start Time	10 0 0
Start Date		End Time	10 0 0
End Date		Total FlowSet Point	

[Save](#) [Reset](#)

DPO/Outlet	FlowSet Point	Start Time	End Time
------------	---------------	------------	----------

[Back](#) Current Irrigation Schedule

Canal	Branch Canal	Distributary	DPO	Financial Year	FlowSet Point	Start Date	Start Time	End Date	End Time
Narayanpur Left Bank Canal	Hunasagi Branch Canal of NLBC	D4 of HBC	DOR-2	2019-2020	1.3	21/07/2019	11:30:12 AM	31/08/2019	9:35:12 AM

Previous Irrigation Schedule

Canal	Branch Canal	Distributary	DPO	Rotation	Financial Year	Total FlowSet Point (In cusecs)	Start Date	Start Time	End Date	End Time
Narayanpur Left Bank Canal	Hunasagi Branch Canal of NLBC	D4 of HBC	DOR-2	1	2018-2019	0.53	14/09/2018	8:16:42 AM	27/09/2018	6:16:42 PM
Narayanpur Left Bank Canal	Hunasagi Branch Canal of NLBC	D4 of HBC	DOL-3	1	2018-2019	0.53	14/09/2018	7:43:48 AM	27/09/2018	5:43:48 PM
Narayanpur Left Bank Canal	Hunasagi Branch Canal of NLBC	D4 of HBC	DOL-4	1	2018-2019	0.53	14/09/2018	7:53:28 AM	27/09/2018	5:53:28 PM
Narayanpur Left Bank Canal	Hunasagi Branch Canal of NLBC	D4 of HBC	DOR-1	1	2018-2019	0.53	14/09/2018	7:51:52 AM	27/09/2018	5:51:52 PM



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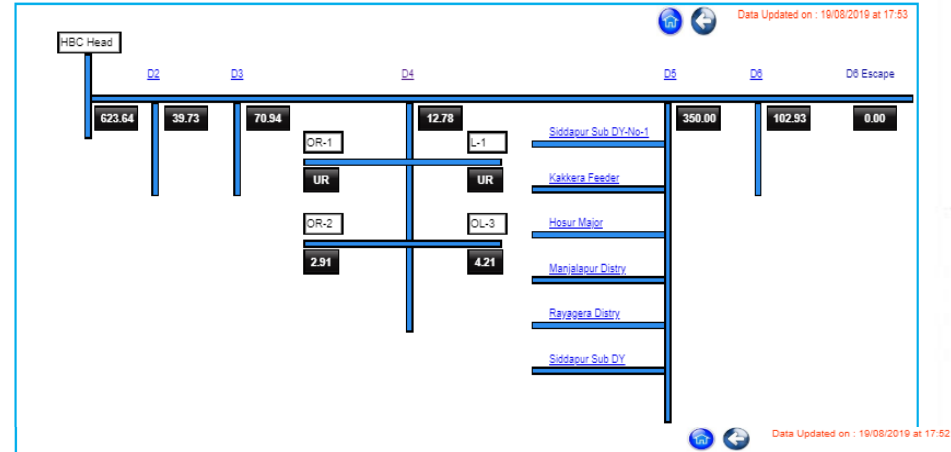
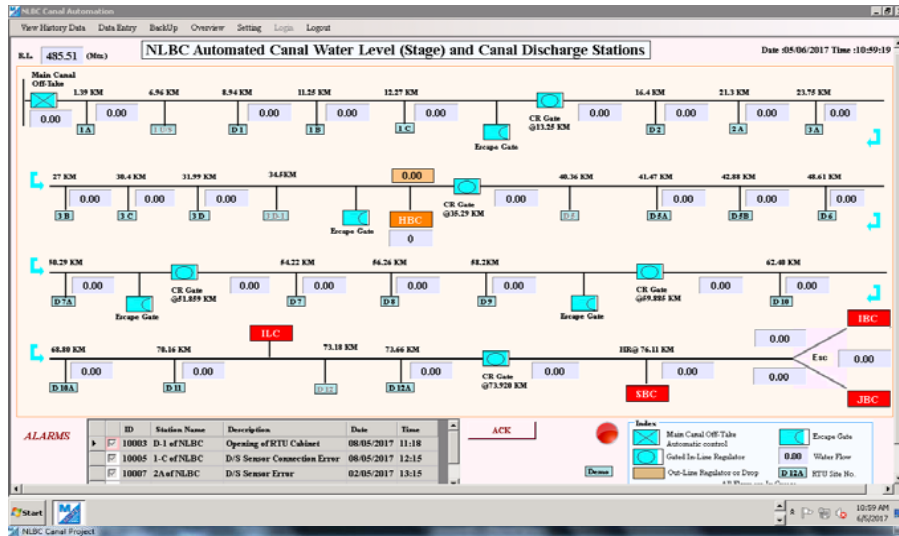
Smart City Water Supply Management

Geographical Information System

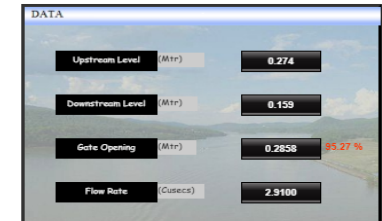
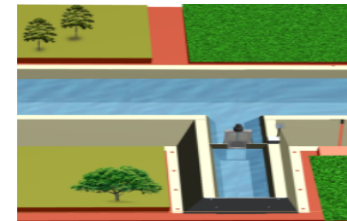
Enterprise Management System (EMIS) & E Governance

Smart Applications

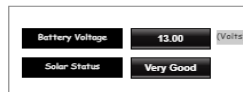
## Canal Control Software GUI



OR2 of D4HBC



Solar Details :-



Alarms :-

Alarm Description	Date	Time
Flow Rate is Greater than Design Flow	07/08/2019	16:15



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Smart City Water  
Supply  
Management

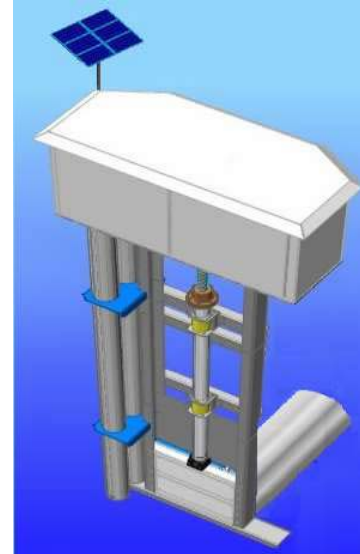
Geographica  
l Information  
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Enterprise Management  
Information  
System(EMIS) & E  
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Smart  
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## Solar powered Smart gate for canal control and monitoring

- Inbuilt Flow Measurements.
- Suitable for Solar /DC/ AC power
- Minimal Power requirements
- Suitable to Retrofit on existing gate structure
- Inbuilt Gate Position sensor with digital Readout
- Limit switches (High, Low, near high, near low)
- Interface with almost all RTUs/PLC
- Push-buttons for Local operations
- RS-485, SDI-12, RS 232 Interface
- MODBUS / PROFIBUS protocols
- Suitable for Local/Remote/Automatic control.
- Flow measurement Accuracy better than +/- 2.5 %
- Programmable units of Measurements FPS / MKS
- Suitable to Integrate with SCADA network
- Level measurement using ultrasonic/Pressure type level sensor.
- Robust construction for Field Operation
- Powers-supply 12 VDC / solar power / 1 phase AC



## Auto Flow Gates for Canal Networks



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## SCADA based operations and controlling system in NLBC



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## NLBC Automated Canal Water Level (Stage) and Canal Discharge Stations

### Summary Report of CR/HR

Date : 19/08/2019 17:19

Location	U/S Level (Mtr.)	D/S Level (Mtr.)	Flow (Cusecs)	HR Gate1 Opening (Mtr.)	HR Gate2 Opening (Mtr.)	HR Gate3 Opening (Mtr.)	HR Gate4 Opening (Mtr.)	HR Gate5 Opening (Mtr.)	HR Gate6 Opening (Mtr.)
NLBC Head Regulator @ 0.0 KM	491.310	487.680	9821.22	0.0000	1.8980	2.2000	1.9980	1.9980	0.0000

Location	U/S Level (Mtr.)	D/S Level (Mtr.)	Flow (Cusecs)	Gate1 Opening (Mtr.)	Gate2 Opening (Mtr.)	Gate3 Opening (Mtr.)	Gate4 Opening (Mtr.)	Escape Level (Mtr.)	Escape Flow (Cusecs)	Escape Gate1 Opening (Mtr.)	Escape Gate2 Opening (Mtr.)
Cross Regulator @ 13.25 KM	484.730	484.650	9675.24	6.0140	6.0960	5.8880	6.0110	479.880	0.00	0.0000	0.000
HBC Cross Regulator @ 35.29 KM	481.720	481.620	8811.24	6.0690	5.8260	5.9420	5.8310	476.870	0.00	0.0000	0.000
Cross Regulator @ 51.895 KM	476.280	476.210	8603.48	6.1000	6.0200	5.9320	5.9320	472.870	0.00	0.0000	0.000
Cross Regulator @ 59.885 KM	476.200	476.140	8305.19	6.1000	6.1000	6.1000	--	471.360	0.00	0.0000	0.000
Cross Regulator @ 73.470 KM	473.840	473.750	8495.54	4.9000	5.0000	4.9320	--	--	--	--	--
Head Regulator for SBC @ 76.110 KM	474.114	473.842	2878.50	2.1000	0.5000	--	--	--	--	--	--
Head Regulator for JBC @ 77.520 KM	474.294	2.353	1015.24	2.6360	2.6520	--	--	--	--	--	--
Head Regulator for IBC @ 77.520 KM	474.302	3.617	2531.14	2.6790	2.6930	--	--	--	--	--	--



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## INMIS – Canal Structure report

Canal Structure Application > Canal Structure Details

**Dam Details** | Search Structure | Canal Structure Report

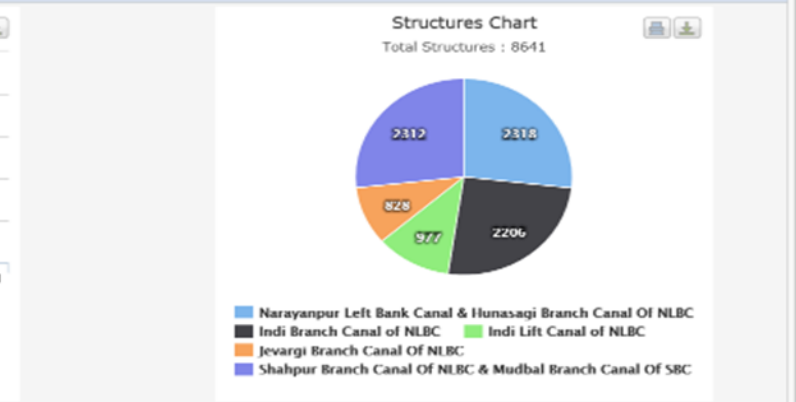
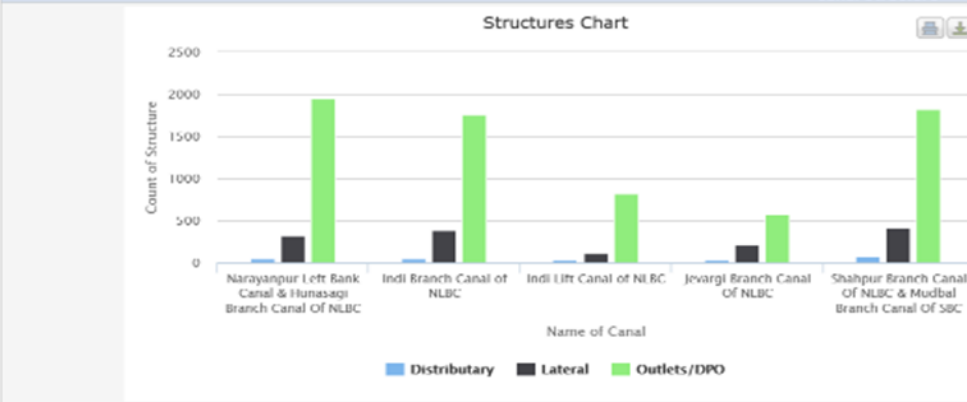
### Dam Details

Name of Dam	Catchment Area (In Sq.Km)	Gross Command Area (GCA) (In Ha)	Total Irrigation Potential (In Ha)	Dam Contents		Add Structure	View Structure Of Dam
				Gross Storage at F.R.L (In MCum)	Live Storage at F.R.L (In MCum)		
Narayanpur Dam	47850	450003		1071.66	863.4	Add Structure	View Structure Of Dam

### Canal Details

Canal	Branch Canal	Sub Branch Canal	Distributary	Sub Distributary	Lateral	Sub Lateral	DPO	Outlet	Total Structure	View Structure
Narayanpur Left Bank Canal	Hunasagi Branch Canal of NLBC	0	29	17	293	27	655	1297	2318	View Structure
Narayanpur Left Bank Canal	Indi Branch Canal of NLBC	0	47	2	307	84	248	1518	2206	View Structure
Narayanpur Left Bank Canal	Indi Lift Canal of NLBC	0	40	0	91	16	345	485	977	View Structure
Narayanpur Left Bank Canal	Jevargi Branch Canal of NLBC	0	25	10	178	36	73	506	828	View Structure
Narayanpur Left Bank Canal	Shahpur Branch Canal of NLBC	Mudbal Branch Canal of SBC	58	14	343	71	480	1346	2312	View Structure
<b>Total Structure</b>			<b>199</b>	<b>43</b>	<b>1212</b>	<b>234</b>	<b>1801</b>	<b>5152</b>	<b>8641</b>	

### Canal Structure



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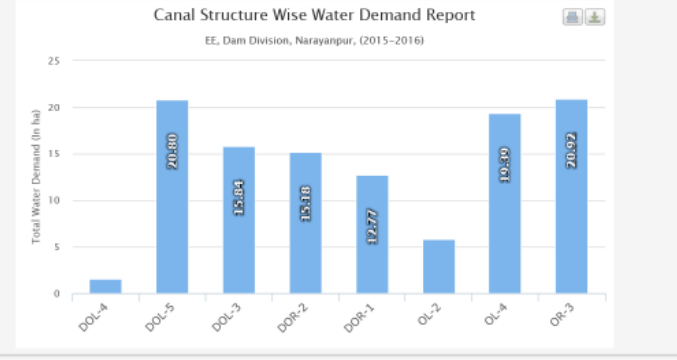
Smart Applications

## INMIS – Water Demand report

Canal Structure Water Demand Report (2015-2016)

S.No.	Canal	Distributary	Lateral	DPO	Total Area (In Ha)	Water Demand Details			
						Demand Area For Kharif (In Ha)	Demand Area For Rabi (In Ha)	Demand Area For 10 Seasonal (In Ha)	Total Water Demand (In Ha)
1	Hunasagi Branch Canal of NLBC	D4 of HBC	NA	DRI-4	1.57	1.57	0	0	1.57
2	Hunasagi Branch Canal of NLBC	D1 of HBC	NA	DOL-5	22.32	20.8	0	0	20.8
3	Hunasagi Branch Canal of NLBC	D1 of HBC	NA	DOL-3	17.80	12.02	3.22	0	15.84
4	Hunasagi Branch Canal of NLBC	D1 of HBC	NA	DOR-2	16.07	15.18	0	0	15.18
5	Hunasagi Branch Canal of NLBC	D1 of HBC	NA	DOR-1	13.51	12.77	0	0	12.77
6	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OL-2	6.64	5.84	0	0	5.84
7	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OL-4	22.35	16.86	2.53	0	19.39
8	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OR-3	23.08	19.22	1.7	0	20.92

GRAPHICAL VIEW OF WATER DEMAND



Back  
Financial Year \*   
Season \*

Canal Structure and WUCS Wise Area Recording Report Kharif (2015-2016)

S.No.	Canal	Distributary	Lateral	DPO/Outlet	Paddy		Bajra		Pulses-Tour Dal		Jowar		Safflower		Groundnut		Total Recorded Area (In Ha)	Total Demand Area % (In Ha)	Total Recorded Area % with respect to Demand Area (In Ha)	
					Water Demand (In Ha)	Recorded Area (In Ha)	Water Demand (In Ha)	Recorded Area (In Ha)	Water Demand (In Ha)	Recorded Area (In Ha)	Water Demand (In Ha)	Recorded Area (In Ha)	Water Demand (In Ha)	Recorded Area (In Ha)	Water Demand (In Ha)	Recorded Area (In Ha)				
<b>Balashettihal</b>																				
1	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OR-2	124.85	124.75	5.64	5.62	0.81	0.81	0	0	0	0	0	0	131.3	131.18	79.59	99.91
1	Hunasagi Branch Canal of NLBC	D4 of HBC	Not Applicable	DOL-5	12.72	12.72	-	-	-	-	-	-	-	-	-	-	12.72	12.72	90.99	100
2	Hunasagi Branch Canal of NLBC	D4 of HBC	Not Applicable	DOL-3	14.12	14.12	0.4	0.4	-	-	-	-	-	-	-	-	14.52	14.52	69.84	100
3	Hunasagi Branch Canal of NLBC	D4 of HBC	Not Applicable	DOL-3	7.08	7.08	3.24	3.22	-	-	-	-	-	-	-	-	10.32	10.3	43.23	99.81
4	Hunasagi Branch Canal of NLBC	D4 of HBC	Not Applicable	DOR-2	10.61	10.61	1.6	1.6	-	-	-	-	-	-	-	-	12.21	12.21	107.86	100
5	Hunasagi Branch Canal of NLBC	D4 of HBC	Not Applicable	DOR-1	19.35	19.35	-	-	-	-	-	-	-	-	-	-	19.35	19.35	96.94	100
6	Hunasagi Branch Canal of NLBC	D4 of HBC	Not Applicable	DOL-4	6.07	6.07	-	-	0.81	0.81	-	-	-	-	-	-	6.88	6.88	68.53	100
7	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OL-2	11.92	11.92	-	-	-	-	-	-	-	-	-	-	11.92	11.92	87.71	100
8	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OL-4	16.85	16.75	0.4	0.4	-	-	-	-	-	-	-	-	17.25	17.15	75.56	99.42
9	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OR-3	6.94	6.94	-	-	-	-	-	-	-	-	-	-	6.94	6.94	89.09	100
10	Hunasagi Branch Canal of NLBC	D4 of HBC	L/S Minor	OR-1	19.19	19.19	-	-	-	-	-	-	-	-	-	-	19.19	19.19	92.22	100



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## Water Auditing and Revenue Generation

### View Bill



**Krishna Bhagya Jala Nigam Ltd..**  
(A Govt. of Karnataka Undertaking)

No. 11985

Kharif ( 2018-2019)

<b>Account Holder / Farmer Name</b>	Mahammad S/D/W/o Husensab Kazi (mah.667)	<b>Survey No.</b>	55/**/*
<b>Name of Village</b>	Balshattihal	<b>Total Area (In Ha)</b>	3.95
<b>Name of Taluk</b>	Shorapur	<b>Distributary</b>	D4 of HBC (Hunasagi Branch Canal of NLBC )
<b>Name of District</b>	Yadgir		
<b>Name of WUCS</b>	Balashettihal WUCS No. 16436	<b>DPO/Outlet</b>	DOR-2

S.No. (a)	Crop Details (b)	Area (In Ha) (c)	Water Rate (In ₹) (d)	Amount (In ₹) (e) = (c) * (d)	Maintainance Tax / Water Tax (f)	Total Amount(In ₹) (g) = (e) + (f)
1	Paddy	3.8	247.25	977	37.62	1014.62
<b>Total Area (In Ha)</b>		<b>3.8</b>	<b>247.25</b>	<b>977</b>	<b>37.62</b>	<b>1014.62</b>

<b>Current Bill Amount (In ₹)</b>	1014.62	<b>Balance Bill Amounts (In ₹)</b>	7728.38	<b>Total Bill Amount (In ₹)</b>	8743
-----------------------------------	---------	------------------------------------	---------	---------------------------------	------

<b>Bank Branch Name</b>			
<b>Name of Sub-Division</b>	AEE, NLBC Sub Div. No. 4, Kodekal		
	A.E.E.KBJNL ,		
	<b>Place</b>	Balshattihal	
	<b>Date</b>		

The name of payee and sign.....Rs.....Rs.(In words only).....

Branch Manager / A.E.E.KBJNL

#### Payment Details

Bill No.	Season	Date of Payment	Total Amount (In ₹)	Net Payable (In ₹)	Paid Amount (In ₹)	Net Balance (In ₹)
----------	--------	-----------------	---------------------	--------------------	--------------------	--------------------



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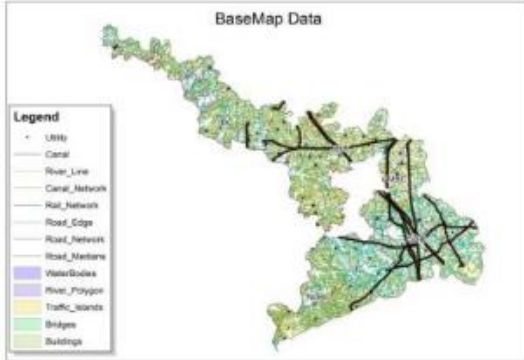
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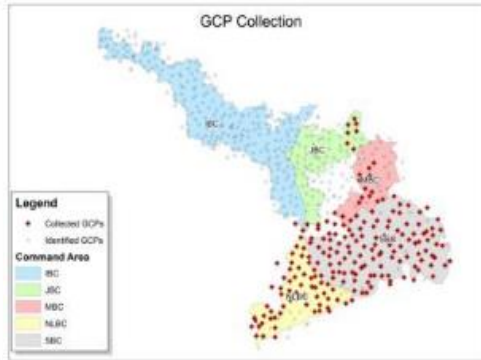
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## KBJNL – GIS Applications

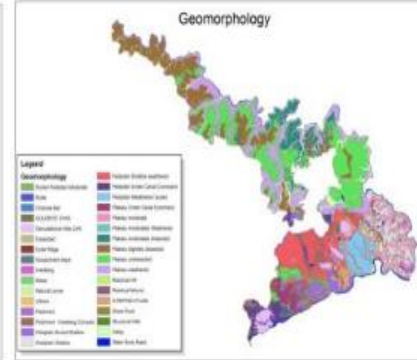
### Base Map



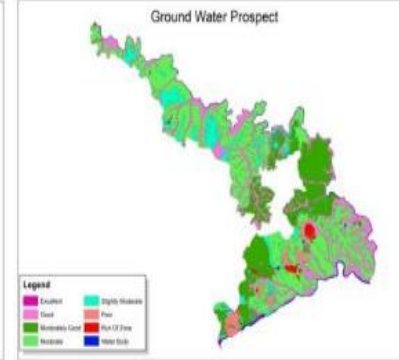
### Ground Control Point



### Thematic Layer-Geomorphology



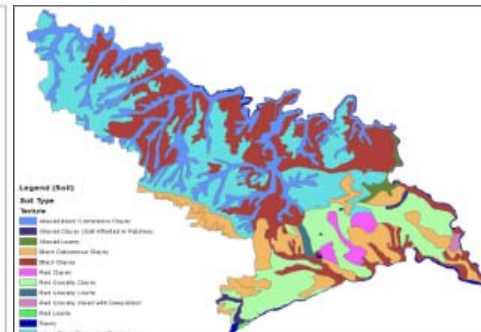
### Thematic Layer-Ground water



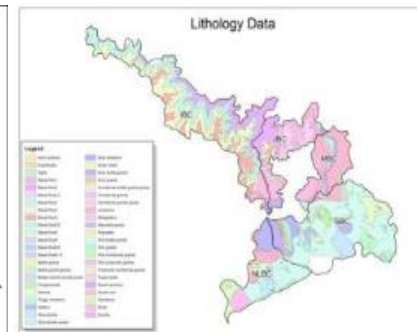
### Administrative Boundaries



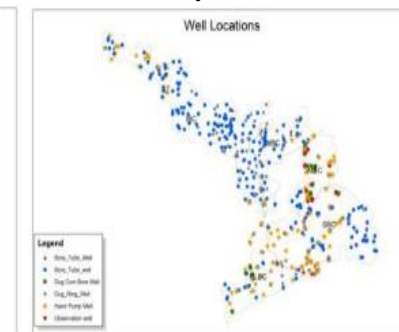
### Thematic Layer – Soil map



### Thematic Layer-Lithology



### Thematic Layer-Well Location



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## Feedback from Stakeholders



This project gives us a lot of benefits.



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## Operational Efficiency Statistics after Implementation of System

Sr. No.	Year	Season	Flow from NLBC HR as per KBJNL Record (TMC)	Total Flow of all NLBC main canal distributories and branch canal (TMC)	Operation Efficiency (%)
1	2016-17	Kharif	46.6	41.828	89.760
2	2016-17	Rabbi	51.76	47.816	92.380
3	2017-18	Kharif	53.175	47.423	89.183
4	2017-18	Rabbi	39.38	35.4	89.893

Sr. No.	Month	Flow from NLBC HR as per KBJNL Record (TMC)	Total Flow of all NLBC main canal distributories and branch canal (TMC)	Operation Efficiency (%)
1	June	0	0	
2	July	4.654	3.68	79.072
3	August	12.726	11.444	89.926
4	Septmber	9.719	9.585	98.621
5	October	16.547	14.471	87.454
6	November	13.454	12.441	92.471
7	December	13.384	12.429	92.865
8	January	9.423	8.826	93.664
9	February	8.15	7.08	86.871
10	March	10.304	9.679	93.934
11	April	0	0	
12	May	0	0	
<b>Total</b>		<b>98.361</b>	<b>89.635</b>	<b>91.129</b>

Sr. No.	Month	Flow from NLBC HR as per KBJNL Record (TMC)	Total Flow of all NLBC main canal distributories and branch canal (TMC)	Operation Efficiency (%)
1	June	0.000	0	
2	July	4.575	3.324	72.656
3	August	15.139	14.156	93.507
4	Septmber	11.153	10.34	92.710
5	October	8.211	6.9	84.034
6	November	14.094	12.701	90.116
7	December	9.429	7.808	82.808
8	January	8.337	7.827	93.883
9	February	9.370	7.839	83.661
10	March	12.225	11.497	94.045
11	April	0.022	0.429	
12	May	0.000	0	
<b>Total</b>		<b>92.555</b>	<b>82.821</b>	<b>89.483</b>



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Hydro  
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Information  
System

Flood Forecasting & flood  
Management System with  
Dam Automation

Canal Automation &  
Smart Irrigation  
Management System

Smart City Water  
Supply  
Management

Geographica  
l Information  
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Information  
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Governance

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## Pre-implementation Scenario

- Suffering of water scarce atchkut area of 1,05,623 ha
- Poor Water Use of Efficiency of 31.75% against Design Efficiency of 51%
- Violation of rotational system / Warabandhi
- Absence of proper water regulatory system
- Inadequate manpower for canal operation
- Methodology as fixed flow structure
- Manual control of the gates
- Inaccuracies, uncertainties in measurement
- Poor emergency response
- Wastage of water
- In equitability between upstream & tail end water users
- No control on unauthorized usage of water
- Violation of cropping pattern leading to uneven crop growth and poor yields
- No accountability due to absence of water accounting & audits

## Post-implementation Scenario

- **First time in the history of NLBC, water delivered to the tail end users suffering atchkut area.**
- **Increased the water use efficiency** in the network due to effective water conservation practices.
- Automatic control of the canal network possible in the absence of operators.
- Water distribution done judiciously, equitably and efficiently among the farmers/stake holders
- Increased crop productivity at tail end
- Increased Irrigated area
- Online water demand, water accounting, auditing, billing & Revenue generation
- Reduce costs by eliminating paperwork and improving processes
- Optimization of water storage
- Real time remote monitoring, control & decision making
- Reduction / Elimination of man-made errors
- **The entire system is functioning successfully since inception, i.e. for last 3 years.**



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## Field Visited by Ministers, Secretary, Advisor and CWC Personnel

**Dr. Sanjeev Banyal**, State Minister Water resources, GoI



**Dr. Amarjeet Singh**, Secretary MoWR, GoI



**Mr. K. Vohra**, Commissioner (SPR), MoWR, GoI



**Mr. R. K. Gupta**, Financial Advisor MoWR, GoI



**Mr. R. K. Jain**, CE, CWC



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Field testing by Prof. Galagali, Prof. D. Gangadhariah, WAPCAS, CWPRS, KBJNL Personnel



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# Thank You Very Much!!

## To Audience &



<sup>3rd</sup> **WORLD WATER**  
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