Hydro Meteorological Information System

Flood Forecasting & flood Management System with Dam Automation Canal Automation & Smart Irrigation Management System Smart City Water Supply Management

Geographica I Information System Enterprise Management Information System(EMIS) & E Governance

Smart Applications

KRISHNA BHAGYA JAL NIGAM LTD.

GIS BASED SMART DIGITAL IRRIGATION MANAGEMENT

CANAL AUTOMATION ON NARAYANPUR LEFT BANK CANAL

Developed, Installed & Commissioned by

MECHATRONICS SYSTEMS PVT. LTD.

PUNE





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Smart Applications

National Water Mission

- Government of India has launched National Water Mission as a part of National action plan for climate change.
- The main objective of National Water Mission is "Conservation of water, minimizing wastage and ensuring its equitable & Judicious 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 is worked out by KBJNL to improve water use efficiency by 25% in Narayanpur Left Bank Canal System through TOTAL SYSTEM IMPROVEMENT.







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Pre Implementation Scenario

- Suffering atchkut of 1,05,623 Ha.
- Poor Water Use Of Efficiency (WUE) 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





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Pre Implementation Scenario

- Poor Emergency Response
- Wastage of water
- In equitability between upstream & tail end water users
- No control on unauthorized usage of water
- Gap in design and actual area
- Violation of cropping pattern leading to uneven crop growth and poor yields
- Excess use of water resulting in soil deterioration due to water logging (about 37,000 Ha) and poor drainage
- No accountability due to absence of water accounting & audits.





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Why Canal Automation.....

Canal systems comprise of vast delivery networks branch canals, distributaries, minors/ sub minors channels, control structures, escape gates.

In order to deliver water to distant points of canal, it is important to evaluate actual demand of water.

In conventional methods, to distribute water considering the variations, it takes a couple of days to reach in the command area.







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Canal Automation- Objective

- The primarily objective of the canal automation project is to **increase the water use efficiency in the network**, as it not only empowers the management to accurate control on flow through gate operation, it also accepts the responsibility of automatically control the canal network even in the absence of operators.
- Canal Automation aims at sharing of water judiciously, equally and efficiently among the farmers/stake holders in command area and reduction of losses. By improving the efficiency of the system it increases the command area by the virtue of saved irrigation water. In turn Increase the crop productivity in the tail end regions.
- A centralized audit system is envisaged providing excesses, deficits and corrective measures taken in canal network. Water accounting and auditing 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.
- Main objective of canal Automation is, to make the canal systems more efficient, responsive, flexible, cost effective and safe.





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Canal Automation - Solutions

Mechatronics Canal Automation Solution -

- Advanced IT infrastructure for canal control and monitoring, Supervisory Control and Data Acquisition Software & GIS based Irrigation Network Management software
- Farmer Information kiosk for online data for crop management like water demand, soil health card, water bill, RTC data, Irrigation schedule, weather conditions, commodity rates etc.
- Advanced series of fully automated gates , control structures and actuators for HR/CR gates
- Accurate flow measurement systems,
- Robust and field proven RTUs,
- Reliable wireless data communication
- Solar power systems for complete autonomy of these field stations.









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Integrated Canal Control

All these methods require simultaneous operation gates at multiple locations of the canal, especially in the case of controlled volume method.

MECH SCADA software automatically figures the gate opening and discharge required at individual locations, and communicates wirelessly at all these locations and operates the gates simultaneously in integrated way.

Through Mechatronics Canal Automation solution, the demand schedule from water users association (WUA) is regularly taken and fed to the Irrigation Network Management Information system (INMIS) software.

The software will consider the variation in demand, the quantity, the schedule and the location of the WUA in advance and operate the canal gate in order to delivery the water at the scheduled time.

Master Control Station







Branch Canal Head



Head Regulator





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Smart Applications

Project Highlights

- Main objective of the project is, to make 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.





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The Project

- Narayanpur Dam is located on Krishna river near Bachihal and Siddapur village of Bijapur District .
- This reservoir caters to the irrigation needs of a very vast area of about 5.4 lakh hectares.
- The reservoir supplies water to Narayanpur Left Bank canal.
- Narayanpur Left Bank canal (NLBC) is the biggest and the main artery of canal network about 77 Kms.
- Designed to discharge of 10,000 cusecs.
- The network also includes Hunasagi Branch Canal, Indi Branch Canal, Jewargi Branch Canal, Mudbal Branch Canal, and Shahpur Branch Canal and Indi Lift Canal and sub systems

















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Smart Applications

SCOPE OF WORK

- 1. 210 farmer Information Kiosks, as part of Water Allocation Management, and as a tool for information collection and dissemination to Water User Cooperative Societies
- 2. Providing and fixing Integrated Automatic Gates at 30 distybutory gates, 335 laterals and DPOs.
- 3. Automation of existing 41 HR/CR/Escape gates on NLBC main Canal with Mechanical Refurbishing and electrical retrofitting
- 4. Geographical Information System (GIS), base map creation and updation every season, Crops mapping, Soil Health, Weather, Water Use, Demand etc.
- 5. SCADA software comprising of Canal Control, Regulation and Simulation
- 6. Irrigation Network Management Information System (INMIS), Planning based on Demands and availability of water, Crop revenue, Crop water requirement, farmer RTC details, Canal asset management etc.
- 7. Establishing Wireless DATA communication network
- 8. Establishing Master control station and training center at Narayanpur
- 9. Establishing 10 Remote Monitoring Stations
- 10. Operation & Maintenance for 5 years









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Installation of Integrated Gate







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Field Installation at Lateral



Before Installation

During Installation







During Installation



After Installation





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Smart Applications

Existing CR, Escape gate Automation















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Main SCADA Center & Training Center







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Smart Applications

Equipments at Master Control Centre



DG Set at Master control



Engineering Station



Control Room



UPS at Master control



Training Centre



Servers at Master control



Training Centre





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Smart Applications

RTU Room at HR /CR Location







Hydro Meteorological Information System Flood Forecasting & flood Management System with Dam Automation

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Smart Applications

Master Control station & RTU Rooms



RTU Room at KM 0.0



RTU Room at KM 51.0



RTU Room at KM 73.0



RTU Room at KM 13.0



Master Control Centre



RTU Room at KM 76.0



RTU Room at KM 34.0



RTU Room at KM 59.0



RTU Room at KM 77.0





















Hydro Meteorologica Information System	I Flood Foreca Management Dam Au	asting & flood t System with tomation Manag	Automation & art Irrigation gement System	Smart City Supply Managen	Water / ient	Geographica I Information System	Enterprise Mar Informat System(EM Governa	nagement ion IS) & E nce	Smart Applications	
Farm	ner Dash I	Board								
									View On GIS	
Back		Personal Details				Office D	etails			
				Name of Z	one CE,	O and M Zone, Narayanpur				
		hadinereddy gidol (Name of Ci	cle SE,	O and M Circle No. 1, Narayanp	our			
		1.1		Name of Divis	ion EE,	Dam Division, Narayanpur				
				Name of Sub-Divis	ion AEE	, NLBC Sub Div. No. 4, Kodekal				
						WUCS D	etails			
				Name of WUCS	Balashett	tihal				
		All a superior		President Name	Hanamant	a Banddi	Contact No.	990066663	5	
Name of Farmer	Mahammad	Father/Husband Name	Husensa Rajesa	Secretary Name	R. M. Khaj	1	Contact No.	9731168999	9	
(In English)		(In English)		Water Source Details						
Name of Farmer	ಂಅಹಮ್ಮ್	Father/Husband Name	e ಉಸೆನ್ನ ಋಅಜೆಸ:)	Name of District Yadoir			Nai	ne of Taluk	Shorapur	
(In Kannada)		(In Kannada)		Name of Village	Balshattihal				Decomposition .	
Contact No.	9972679463	Email ID	Not Available	Canal	Hunasani Branch Canal Of NI BC			istributary	D4 of HBC	
Address	Balshattihal . Yadgir : Shorapu	Aadhaar Number	713433190948	Lateral	L/S Minor			OPO/Outlet	OR-1	
Caste	Muslim									
	Farmer Lan	d Details	Change Owner	Soil Health C	rd					
Surve	/ No. 55/*/*			View Water D	emand					
Total Area (In	Ha) 4	Total Area (In Acre:Guntha)	10:0	View Bill						
Latitude [Deg:Min:	Sec] 16:23:15	Longitude [Deg:Min:Sec]	76:29:49	Irrigation Scl	edule					





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(https	://192.168.1	1.103:80/fd/control/add\	WaterDemandDeta	ils		~	C	<mark>8</mark> ▼ Google		Q ☆	ê	♦	⋒	≡
	E CAR	ೈಷ್ಣಾ ಭಾಗ್ಯ ಕರ್ನಾಟಕ ಸಕಾ RISHNA BH	ಜಲ ನಿಗಮ ನಿಯಮಿತ ^{Fdದ ಉದ್ಯಮ)} AGYA JALA NIGAM LTD.						Home	e www.kbjnl.con V	n िस्तूब /elcome	龍君 Er , Neela	nglish mma (Logo nee.10	, t
Ter	minal	emment of Ka	mataka Undertaking (Water De	mand For R	abi (2011-2012)								
Farmer's I	Name	Neelamma		Father's/Husband's Name	Mallappa Sajjan										
Di	istrict	Yadgir		Taluk	Shorapur										
v	fillage	Bailkunti		Survey No.	1/43.C										
Total	l Area	0.050585		Date											
Cro	op			Area											
Agr	riculture														
Gro	oundnut			0.050	Ø										
Jow	var				0										
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Hydro Meteorological Information System	Flood Manao D	Forecasting & flood gement System with am Automation	Canal Auto Smart Irri Managemer	mation & gation ht System	Smart City Water Supply Management	Geographi I Informati System	ca on	Enterprise Manager Information System(EMIS) & Governance	nent E Applications	
Farme	r Wa	iter Deman	d							
0			V	iew Wate	r Demand					
			Applicatio	on for suppl	of water on dema	and				
	Zone	CE, O & M Zone, Naraya	anpur			Circle	SE, O	& M Circle No. 1, Nar	ayanpur	
	Division	EE, Dam Division, Nara	yanpur		:	Sub Division	AEE, I	NLBC Sub Div. No. 4,	Kodekal	
	Project	Narayanpur Dam				Canal	Hunas	agi Branch Canal		
	District	Yadgir				Taluk	Shora	pur		
	Village	Kurekanhal			Nar	me of WUCS	Yaraki	hal		
Financ	ial Year	2013-2014								
Dist	ributory	D2				Lateral	L1			
	Outlet			Chainage of o	outlet from which wate	r is required	2			
Name of	Name of Season Kharif			Сгор				Groundnut		
Total Demaned Area	Total Demaned Area (in ha) 35.405			Last Date for Apply on Water Demand				20/08/2015		
Name	e of occupi	iers requiring irrigation		Father's/	Husband's Name	Categ	jory	Survey No.	Area (In ha)	
	Somap	opa Dyavappa		Hulaga	appa Dyavappa	GE	N		4	
		Ashish			Akash				3	



















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Hydro Meteorological Information System Flood Forecasting & flood Management System with Dam Automation

Canal Automation & Smart Irrigation Management System Smart City Water Supply Management Geographica I Information System

Enterprise Management Information System(EMIS) & E Governance

Smart Applications

Soil Health Card

	50	i Health Card	Details		
		Soil Health Card Details [20	014-2015]		
Project	Design, Manufacturing, GIS system for NLBC N	, Supply, Installation, Operat letwork	tion and Maintenance	of Phase I of SCA	DA based automation and
Organization	Krishna Bhagya Jal Niç	jam Limited			
Sample UID	111		Lab Testing Model No.		
District	Yadgir		Date		
Taluk	Shorapur		Village	Kurekanhal	
Name of the farmer	Somappa Dyavappa		Caste	Dori	
Category	GEN		Land Survey No.	1/2	
Sample Details of Soil and Water			GPS Coordinates	Lat-16:20:46 Long-76:22:35	
Area Under Cultivation			Soil Type	Black	
Water Resource			Soil Depth	Deep	
	Kharif		C	Kharif	
Proposed Crops and Variety	Rabi		Variety	Rabi	
	Bi-Seasonal		valiety	Bi-Seasonal	
Soil Test Report					
Test	Normal Range	Value	Micro	Nutrients	Value
pH Content	6.5-8.0	8.15	Copper [Cu]	(µg/kg)	54.4
Salt Content [EC] (dS/m)	1.0dS/m	0.136	Iron [Fe] (µg/	kg)	12840
Available Nitrogen [AVN] (kg/acre)	280-560	88.39	Sulphur [AS]	(mg/kg)	13.29
Organic Carbon [TOC] (%)	0.5-1.0	0.64	Manganese	[Mn] (µg/kg)	2958.49
Available Phosphorous [AP] (kg/acre	22.9-56.3	23.22	Zinc [Zn] (µg	/kg)	305.86
Available Potash [AK] (kg/acre)	140-336	176.57	Boron [B] (µg	J/kg)	41.58
			Molybdenum	[Mo] (µg/kg)	0

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Smart Applications

State level commodity rates

State Level Commodity Rates Format

Сгор	Minimum Price(In ₹)	Maximum Price(In ₹)
Cereals		
Wheat / กํ.ดะฉิr>		
Bansi / ພລິ (*)	1700	2900
Mexican / ಮೆಕ್ಸಿಕನ್ (*)	1200	1351
Sona / ಸೋನ (*)>	1400	2200
Red / ಕೆಂಪು (*)	2200	2800
White / むぐ (*)	1409	2489
.H.D / జృబి డా (*).	1350	1400
Local / ಸ್ಥಳೀಯ (*)	1500	3200
Medium / ಸಾಧಾರಣ (*)	2500	2900
Mill Wheat / ಗಿರಣೆ ಗೋಧಿ (*)	2500	3600
Sharabathi / ಶರಬತಿ (*)	1404	2604
Other / ಇತರೆ(*)	1400	2300
Paddy / ಭತ್		
Paddy / 약궄-1 (*)	950	3800
I.R. 64 / ఐ.ఆరో.64 (*)	1400	2100





























Hydro Meteorological Information System

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Asset

Crop Revenue (Billing & Revenue Collection)



Water User Co-Op Society

Soil Health Card











Serield marked with asterisk (*) are Mandatory E, O and M Zone, Narayanpur Name of Sub-Division AEC, NLBC Sub Div. No. 4, Kodekal E, Dam Division, Narayanpur Name of Sub-Division AEE, NLBC Sub Div. No. 4, Kodekal Yadgir Name of Taluk* Shorapur Image: Shorapur Yadgir Name of Taluk* Shorapur Image: Shorapur Yadgir Image: Shorapur Image: Shorapur Image: Shorapur Yadgir Image: Shorapur	Determine of Division Survey No.* Latitude In [Deg: Min: Sec.] format Longitude In [Deg: Min: Sec.] format Survey No.* Latitude In [Deg: Min: Sec.] format Total Area (In Ala)* Total Area (In Ala)** Total Area (In Ala)** Survey No.* Latitude In [Deg: Min: Sec.] format Total Area (In Ala)* Total Area (In Ala)*	Determine of Circle SE. Or and Microle No. 1. Naray anpur Name of Circle SE. Or and Microle No. 1. Naray anpur Name of Circle SE. Or and Microle No. 1. Naray anpur Name of Circle SE. Or and Microle No. 1. Naray anpur Name of Circle SE. Or and Microle No. 1. Naray anpur Mane of Circle SE. Or and Microle No. 1. Naray anpur Name of Sub-Drivision AEE. NLBC Sub Div. No. 4. Kodekal me of Girles Y adgir Name of Fallek Sorapur Mahammad (In English) Father/Husband Name Husensa Rajesa (In English) Mare Kather Pather/Husband Name Husensa Rajesa (In English) Mare Kather Caste Muslim Total Area (In Mare Muslim) Mare Kather In Hindiy Caste Muslim Total Area (In Mare: Guntha)*	ice Details Name of Zone Iame of Division	CE, O and M Zone, Nari						
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Smart Applications

INMIS– Water Bill Generation

9				v	iew Irri	gation	Water	Bill Pay	ment	Detail				
					-	Irrigation	Water Bill	For Agreeme	ented					
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Name of	Farmer	Somapp S/D/W/o Dyavap	a Dyavappa Hulagappa pa	Cast	te Dori	Ca	ategory G	EN Sea	ason Ki	narif Date	ofissue	29/09/2014	Due Date	30/11/2014
			Area	a (in ha)			Rate	(Per ha.)		Remission	Previous	Remissio	on l	
Account No. (1)	Survey No. (2)	Outlet (3)	Authorized Area	(4) Un-Authorized Area	Total Area (In ha) (5) (a + b)	Crop (6)	Authorized	(7) Un-Authorize	Curren Amoun d (In)	t Against It Current Amount (In	Years Arrear's Amount (In	Against Previous Amount (Total s Amount (In In ₹)	Remark (13)
			(a)	(b)	(a + b)		Rate	Rate	(0)	(9)	(10)	(11)	(12)	
154	154 1/2 2 0 2 Paddy 100 - 200 0 20												200	
Total Area (In ha)2Penalty On Arrears Amount(In ₹)														
										Maintena	ance Tax (10	0 ₹ Per ha.)	200	
											Total Am	nount (In ₹)	400	
										Apply Pena	lty After Due	e Date (In ₹)	20	
										Total A	mount to be	e Paid (In ₹)	420	
											(Fou	r Hundred T	wenty Only)	

















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KBJNL – GIS

















Thematic Layer-Geomorphology



Thematic Layer-Lithology



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Water is Life, Conserve it !

Thematic Layer-Ground water



Thematic Layer-Well Location





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Benefits

- 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.
- 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





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Benefits of Smart Integrated Water Resource Management

- Reduce costs by eliminating paperwork and improving processes
- Enhance collaboration and knowledge sharing within government & stake holders
- Transparent: Convenient: Consistent: 24x7 self-service: predictable and reliable Customized: tailor service delivery to customer needs
- Build community among global citizens, suppliers, employees and stakeholders
- Create attractive environment for foreign investment in the country
- Increase access of national businesses to the world economy and markets
- Facilitate the formation of businesses and increased employment
- Optimization of water storage





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- Real time remote monitoring and control
- Instantaneous Decision making
- Early flood forecasting and warning
- Efficient flood routing without affecting safety of structures.
- Increased power generation
- Reduction / Elimination of man-made errors
- Easy and efficient model analysis for further use
- Single room control for reservoir and canal operation
- Reduction in operational costs.
- Increased Agriculture Produce
- Better service to the water users
- Easy management of the water system
- Reduced maintenance requirements
- Fish and wildlife enhancement
- Decreased flood damage
- Better response to emergencies





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Visits of Authorities & Dignitaries to Project





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Hon'ble Mr. D. K. Shivkumar, Minister for Water Resource and Medical Education, Govt. of Karnataka.





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Hon'ble Dr. Sanjeev Banyal, State Minister Water resources Govt. of India





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Dr. Amarjit Singh Secretary MoWR India & Mr. Rakesh Sing Principal Secretary WRD Karnataka





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Field Visit of Mr. R. K. Gupta Financial Advisor MoWR India





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Mr. R. K. Jain CE, CWC Visit to Site





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Field visit KBJNL officers from HO on 2nd Dec 2015























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Joint Field visit of M.D. KBJNL, WAPCOS, CWPRS on 8th Dec 2015

















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Thank You



