

MAHARASHTRA JEEVAN PRACHHARAN

NON-REVENUE WATER & SUJAL NIRMAL ABHYAN OF MAHARASHTRA

Presentation in OI conference New Delhi on Feb 2011.
By
Rajendra Holani, Chief Engineer, MJP, Mumbai (rajholani@gmail.com)

18 February 2011 MAHARASHTRAJEEVAN.PRACHHARAN

PRESENTATION STRUCTURE

- Present situation of Urban water supply in Maharashtra
- Reforms program in "Sujal - Nirmal Maharashtra"
- Water Audit & NRW

18 February 2011 MAHARASHTRAJEEVAN.PRACHHARAN

PRESENT SITUATION OF URBAN WATER SUPPLY IN MAHARASHTRA

18 February 2011 MAHARASHTRAJEEVAN.PRACHHARAN

Urban settlements in Maharashtra

Category	No of settlements
Municipal Corporations (Population > 10,00,000)	6
Municipal Corporations (1M <Population > 3,00,000)	16
'A' class Municipal Councils (300 T <population > 100 T)	18
'B' Class Municipal Councils (population > 40 T & < 100T)	62
'C' Class Municipal Councils having population above 20,000	63
'C' Class Municipal Councils having population below 20,000	79
Nagar Panchayats (semi urban)	3
Total	247

18 February 2011 MAHARASHTRAJEEVAN.PRACHHARAN

Present Water Supply & Sewerage in the

- 359 water supply projects for 247 ULBs however only one provides 24x7 water supply.
- Norm of Water Supply-
 - 70 LPCD for urban towns not having sewerage system.
 - 135 LPCD for urban towns having sewerage system.
- Current status of towns in Maharashtra

Existing situation	Corporation & Class A	Class B	Class C	Total
Less than 50% of norm	5	11	39	55
> 50% of norm. to <75 %	11	23	46	80
>75 % of norm. <100%	13	11	40	64
>100% of norm.	12	17	19	48
Total	41	62	144	247

18 February 2011 MHARSHRUEVAI@PRODHKARN

Present Water Supply & Sewerage in the

Issues encountered by water supply authorities

- 20% of water supply schemes are still not fully functional & provide 24x7 water supply.
- Most of the water supply schemes are less than 5 years old.
- Non-payment of water charges is the range of 20 to 80%.
- Only 40 to 50% schemes are operational through town connections.
- Discontinued connections.
- The ULBs generally do not have proper O & M cost, leading to poor water sustainability.
- Lack of staff & resources to high level of leakage.

18 February 2011 MHARSHRUEVAI@PRODHKARN

Present Coverage (% of connection of total HH) of 188 out of 247 ULB

ULB Class	Percentage of coverage			
	20-40	40-60	60-80	20-80
A	6	3	1	10
B	15	26	9	50
C	30	61	23	114
MC	5	4	3	12
NP	2	0	0	2
Grand Total	58	94	36	188

18 February 2011 MHARSHRUEVAI@PRODHKARN

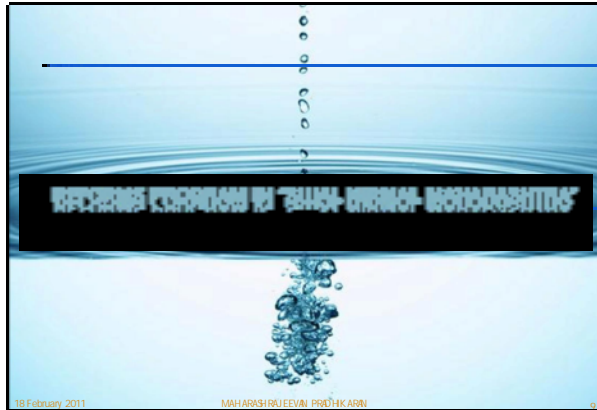
Present Percentage of recovery against total annual O & M expenditure of available data of 174 out of 247 ULB

Range of % recovery	Total No of ULB
20 to 50	63
50 to 100	78
100 to 200	32
Total	174

Average, Min and max % recovery against expenditure ULB class wise

ULB Class	No of ULB	Average recovery (%)	Min recovery (%)	Max recovery (%)
A	11	69.21	22.13	191.58
B	55	66.93	21.72	133.12
C	99	24.28	20.01	187.60
MC	6	67.59	47.43	156.82
NP	3	67.84	24.39	79.88
Grand Total	174	70.97	20.01	191.58

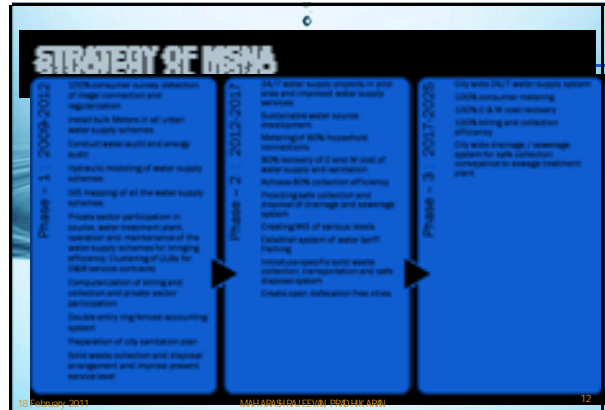
18 February 2011 MHARSHRUEVAI@PRODHKARN



OBJECTIVES OF DEFENSIVE PROGRAM

- **Ultimate Aim of the program:**
 - To assist all 247 ULBs in the state achieve 24x7 water supply system with Interim objective to increase no. of hours of supply and improve service.
- **Objective of the program:**
 - To make the water utilities sustainable
- **Focus of the program:**
 - E Reduce Non Revenue Water
 - u To detect thefts, irregular connections in the system by use of technology along with actual survey
 - u Use of Technology to detect leaks and other problems in the system
 - E Reduce Energy costs by making technical changes to the Electrical System
 - E Know the exact requirements and capital investments for the ailing system
 - E Make the consumer centric approach for the service

18 February 2011 MAHARSHI RAVEEN PONDHUKARN 11




GIS Mapping

Objectives

- o Map all the assets with reference to ground situation

Activities

- o Procurement of Satellite Imagery
- o Creation of Base Map
- o Field survey for map updation and land mark capture
- o Geo-Spatial data integration
- o Project Report
- o Use of consumer data in Hydraulic modeling, water audit, demand-supply analysis and integrated water billing software



18 February 2011 MAHARASHI RUIEEVNI PRDTHKARNI


Consumer Survey

Objectives

- o Know Your Consumers
 - u Identification
 - u Economic Status
 - u Details of the house / building
 - u Quantity and use
 - u Health information
 - u Exact Demand of Water

Activities

- o Map each house and consumer in GIS
- o Carry out house to house survey
- o Attach database of each house to GIS
- o Find out the unregistered connections
- o Put them in tax net



18 February 2011 MAHARASHI RUIEEVNI PRDTHKARNI

Water Network & Asset Mapping

Know the health of your Assets

- u Pumps & Electrical Assets
 - o By Energy Audit
 - o Improve to reduce energy requirements
- u Pipe network & WTPs
 - o By Water Audit
 - o Improve to reduce physical losses

18 February 2011 MAHARASHI RUIEEVNI PRDTHKARNI

Hydraulic Modeling

Simulate existing network

- u Use hydraulic modeling tools
- u Use data collected using meters pressure sensors and house hold surveys
- u Model the existing network Calibrate it
- u Find out the problems in the system
- u Find out corrective measures
- u Minimize Uneven Water Distribution
- u Proper Planning of Distribution Network
- u Estimate the capital investment and management measures required and implement

18 February 2011 MAHARASHI RUIEEVNI PRDTHKARNI

Computerized Billing & Collection System

Objectives

- Install permanent bulk meter for each DMA
- Consumers to be metered
- Make GIS based computerized billing and recovery system
- Make the infrastructure amenable to continuous water audit
- Effective Recovery & Proper Maintenance of Accounts

Activities

- Calculation of water consumption bill
- Calculation of Arrears
- Consumer bill Receipt
- Generation of reports (like Areas, Demand and Recovery Report)

18 February 2011 MAHARASHTRUJEVAI PRATHAKARN

Energy Audit

Objectives

- To identify the areas to reduce the specific energy input in water supply
- To identify the actions with cost benefit analysis
- Monitoring & evaluation system for energy efficiency
- To advise concerned authority for procurement of equipments / machinery in the pumping stations with regards to energy efficiency

Activities

- Detail Data collection and field measurements
- Pre Feasibility Report
- Detailed Project Report
- Based on DPR implementation of Rehabilitation plan to achieve substantial savings in Energy Cost

18 February 2011 MAHARASHTRUJEVAI PRATHAKARN

Water Audit

Objectives

- Carry out Water audit and leak detection using standard water balance diagram to find out NRW

Activities

- Detail Data collection and field measurements
- Pre Feasibility Report
- Detailed Project Report
- Based on DPR implementation of rehabilitation plan to reduce the NRW in the system

18 February 2011 MAHARASHTRUJEVAI PRATHAKARN

Sanctioned Reform works in ULBs under MSNA

Sr. No	Region	AA given	Sanctioned cost (Rs Crores)	GIA (Rs Crores)	Loan (Rs Crores)	PC (Rs Crores)
1	Pune	10	71.78	58.99	5.62	7.17
2	Nagpur + Amravati	16	81.33	71.02	2.18	8.13
3	Kokan	5	18.25	15.99	0.40	1.86
4	Nashik	5	20.48	17.32	1.11	2.05
5	Aurangabad	27	157.43	132.74	9.04	15.65
	Total	63	349.27	296.06	18.35	34.86

18 February 2011 MAHARASHTRUJEVAI PRATHAKARN

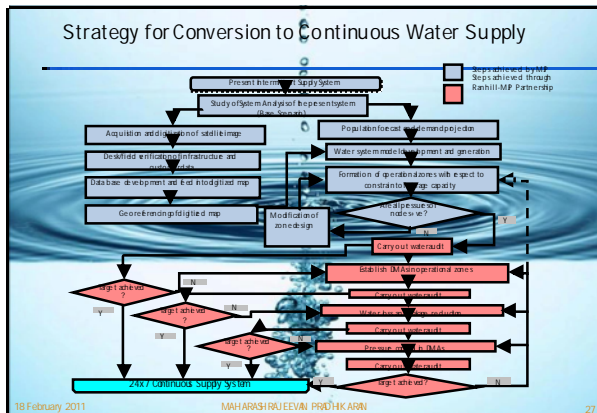
PRESENT STATUS OF WORK PROGRAM

- GIS maps completed - 25 towns
- House hold survey completed - 25 towns
- House hold survey completed & analysed - 13 towns
- Energy Audit completed - 18 towns
- Water Audit completed - 5 towns
- Computerised billing completed - 5 towns
- Hydraulic modeling completed - 8 towns

18 February 2011 MAHARSHIRAJEEVJI PRODHKARN

WATER CHIT - OUR DUTY

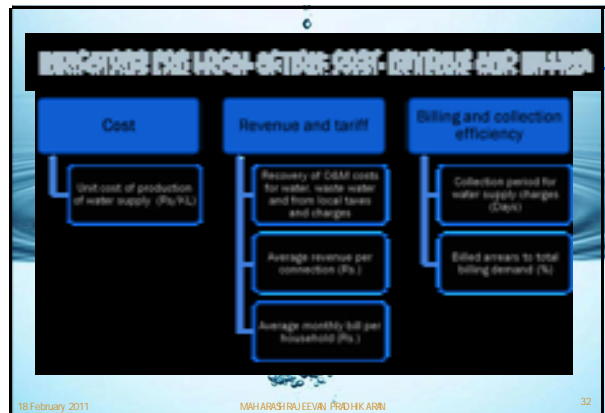
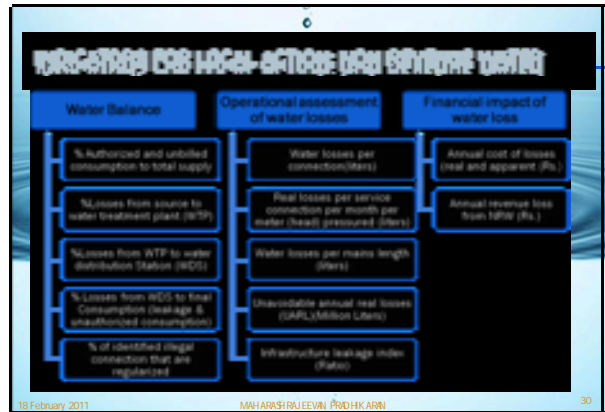
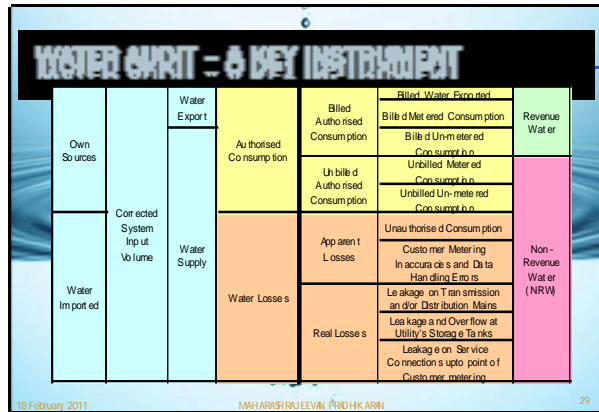
18 February 2011 MAHARSHIRAJEEVJI PRODHKARN



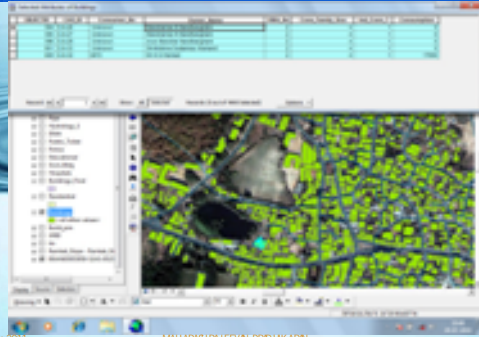
WATER CHIT - OBJECTIVES

- To determine the operational efficiency of the system
- To determine sources of water loss and hence revenue loss
- Thorough accounting of all water in and out of a utility
- In depth record and field examination of the distribution system

18 February 2011 MAHARSHIRAJEEVJI PRODHKARN



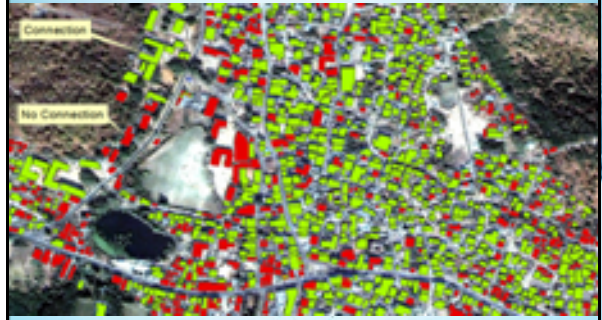
GIS AND CONSUMER SURVEY INTERLINKING



18 February 2011

MAHARSHIRAJEEVAI PRADHAKARN

GIS based Connections



18 February 2011

CONSUMER SURVEY FINDINGS IN SOME TOWNS IN MAHARASHTRA



18 February 2011

MAHARSHIRAJEEVAI PRADHAKARN

PRESENT STATUS OF WWSR FOR SOME TOWNS

Unregistered connections

To wn	No of houses	Re gistered connections	Unregistered connections	Without connections
Amravati	131146	68768	495	61883
Badlapur	16500	12752	297	700
Ambarnath	26488	17000	135	1000
Ramtek	3971	2513	603	855
Sawner	7067	3723	447	2891
Narkhed	6015	3048	380	2587
Ahmedpur	12152	3430	2646	6076
Patur	4143	1329	464*	2350

18 February 2011

MAHARSHIRAJEEVAI PRADHAKARN

Additional Revenue from legalising unregistered connections

To wn	Populati on 2001	Daily WS in MLD	Rate struct. Meter/ Flat	Revenue billed with present conn Rs lakhs /year	Expendi ture Rs. Lakhs /Year	Addi. Revenue with unregistered brought in tax net lakh Rs /Year
Amravati	549510	80	M	2400	1400	0.60
Badlapur	100000	35.50	M	700.96	617	5.5
Ambernath	203000	42.50	M	712.28	865.25	2.7
Ramtek	21821	1.66	M	21.82	45.78	3.30
Saoner	32811	2.72	Flat	34.47	49.30	4.13
Narkhed	26827	2.4	Flat	25.56		3.19
Ahmedpur	35805	4	F	35.91	83.29	15.53
Patur	24227	1.74	M	40.77	53.61	6.05

18 February 2011

MAHARASHTRA JEEVAN PRODH KARN

Annual water balance of Badlapur WSS of Maharashtra

System Input Volume	Authorized Consumption	Unbilled Authorized Consumption	Unbilled Metered Consumption	Unbilled Unmetered Consumption	Unauthorized Consumption	Commercial Losses	Water Losses	Physical Losses	Revenue Water	Non-Revenue Water
6,548,194 l/m 31	3,641,253 l/m 31	1,218 l/m 31	600,300 l/m 31	1,158 l/m 31	55,632 l/m 31	56,132 l/m 31	2,908,009 l/m 31	2,850,809 m 3/day	3,641,095 l/m 31	2,908,159 l/m 31
Error Margin (+/-): #VALUE!	0.0%	Error Margin (+/-): 9.0%	Error Margin (+/-): 9.5%	Error Margin (+/-): #VALUE!	Error Margin (+/-): 17.5%	Error Margin (+/-): 17.3%	Error Margin (+/-): #VALUE!	Error Margin (+/-): #VALUE!	3,641,095 l/m 31	Error Margin (+/-): #VALUE!

18 February 2011

MAHARASHTRA JEEVAN PRODH KARN

Badlapur Water Audit – Key Indicators

- Total NRW 44.38 %
- Authorised unbilled consumption 0.02 %
- Commercial losses 0.86 %
- Physical losses 43.5 %
- Water loss per conn per day 4561 litres
- Water loss per Km length of mains 20.37 cu. M. / hr
- Annual Cost of losses 40.86 Million Rs
- Annual cost of apparent losses 0.86 Million RS
- Annual cost of real losses 40 Million RS

18 February 2011

MAHARASHTRA JEEVAN PRODH KARN

Pre and Post MSNA Project Situation of two Wards of Amravati city

S.No	Parameter considered	Arun Nagar Ward		Sai Nagar Ward	
		Pre Initiative	Post Initiative	Pre Initiative	Post Initiative
1	Water supplied / day	1.95 MLD	1.48 MLD	1.80 MLD	1.60 MLD
2	Supply hours	4 hours	24 Hrs	5 hours	24 Hrs
3	Pressure	31%	35%	58%	60%
4	WTR Backflow	53%	33%	37%	29%
5	Water stored levels	7 Nos	3 Nos	Nil	Nil
6	Water loss (implosion / RCD)	252	165	200	170
7	Number of Connections	137	149.6	170.8	188.0
	Metered meters	119.8	136.6	160.6	174.0
	Non-metered meters	182	130	192	140
8	Monthly complaints	61	28	32	18
9	Residual Chlorine (mg/l)	0.12	0.2	0.15	0.2
10	Water born disease cases	8	4	3	1
11	Water leakages rectified / month	61	28	32	18
12	RTI Cases filed	No	Yes	No	Yes
13	Assessment month (Rs. lakh)	2.98	2.89	3.2	3.63
14	Security / month (Rs. Lakh)	2.56	2.31	3.01	3.04
15	Operating staff for O&M		1	2	0

18 February 2011

MAHARASHTRA JEEVAN PRODH KARN

MEASURED NRW LEVELS OF SOME TOWNS

Sr No	Name of town / Area	% NRW
1	Badlapur	44.38
2	Amrawati (Arjun Nagar)	51 reduced to 33
3	Amrawati (Sai Nagar)	37 reduced to 25
4	Malkapur	12

18 February 2011 MAHARSHI RAVEEN PONDHARKAR 41

EXPLAN- ESTIMATE OF NRW IN SOME TOWNS

Sr. No.	Name of town	Estimated NRW %
1	Karanja	41
2	Chikhaldara	32
3	Akot	25
4	Patur	48
5	Gondiya	41
6	Anjangaon	21
7	Jalgaon Jamod	32
8	Khamgaon	51

18 February 2011 MAHARSHI RAVEEN PONDHARKAR 42

