Performance Assessment System for Urban Water Supply and Sanitation

Documentation of Good Practices

Improving Water Supply through Technical Upgradation and People's Participation (Karad Municipal Council, Maharashtra) India

All India Institute of Local Self Government, Mumbai

May 2010

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By-

Gauri Kawale, Aditi Hastak

All India Institute of Local Self Government, Mumbai

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Contents

Abbreviations

AFM	Automated Flow Meter
APFC	Automated Power Factor Control Unit
CBO	Community Based Organization
DPH	District Public Health Laboratory
GC	Group Connection
Govt.	Government
GR	Government Resolution
JnNURM	Jawaharlal Nehru National Urban Renewal Mission
HHs	Households
KMC	Karad Municipal Council
MC	Municipal Council
MSNA	Maharashtra State Nodal Agency
MWSSB	Maharashtra Water Supply and Sewerage Board
Rs.	Indian Rupees
SJSRY	Swarna Jayanti Shahri Rojgar Yojana
SP	Stand Post
UIDSSMT	Urban Infrastructure Scheme for Small and Medium Towns
ULB	Urban Local Body
US $	United States Dollars
WTP	Water Treatment Plant
WQT	Water Quality Test

Executive Summary

Ensuring adequate and good quality water supply for cities has gradually turned into a challenge with increasing urbanization. The population continues to grow at a rapid pace, but the natural, human and material resources are limited, thus posing a challenge for cities.

Karad, a B Class Municipal Council in Maharashtra state of India too faced this challenge and had to come up with practical and cost effective solutions in order to deal with this. Prominent issues faced were low efficiency, low quality of water leading to recurrent epidemics of water borne diseases, insufficient service to slums and excessive expenditure on supply. The Karad Municipal Council (KMC) adopted a two pronged approach – adoption of effective technology and peoples' participation. Technological up gradation was taken up at the water treatment plant. Automised Flow Meters (AFM) were installed at the pumping station enabling accurate measurement of water lifted resulting in reduction in expenditure. Previously, in absence of the meter, KMC had to bear 25% more cost for the same. Automatic Power Factor Control Panel (APFC) was installed at the treatment plant which enabled efficient use of electricity, thus bringing down the costs and also gaining an incentive from Maharashtra State Electricity Board. Put together, the KMC now saves upto Rs. 2, 11,000 /- annually[1] (US $ 4,494.63)[2].

Access to water supply of slum dwellers was improved by replacing the public stand posts by paid group connections. People's participation was ensured in the process since this entailed more responsible utilization by the slum dwellers and payment of charges for usage. There were awareness generation meetings conducted and community's views were considered. Community was sensitized about the potential benefits that would outnumber concerns such as levying of charges.

[1] Figure has been provided by KMC for the year 2009-2010

[2] Currency rate as of 24th May 2010 is 1 US $ = INR 46.94

Though prima facie this may sound a preliminary aspect of people's participation in the form of consultation it is worthwhile to highlight considering the earlier sensitivities of the community.

For improving the quality of water, meticulous testing procedures were adopted at water treatment plant and consumer level and corrective measures are undertaken immediately if required. Due to this, there has not been a single incidence of epidemic since May 1993. The two pronged strategy and focused efforts have finally resulted in what every ULB would wish for – efficient water supply across the city throughout the year, and satisfaction among the citizens.

1. Introduction

Adequate and quality water supply is an essential basic service, and every citizen is entitled to it. However, provision of this service involves several challenges in terms of infrastructure, availability of material and human resources and participation of people. Every city has to deal with these subjects in its respective local situation, and does so in its own way. However, it is interesting that in many cases the approach and resources could be similar, but the difference in impact is noteworthy. One such case is of Karad Municipal Council (KMC).

The KMC faced issues in water supply services, like inefficiency of systems, insufficient access, high expenditure, need for compliance with regulations, etc. But by adopting specific strategies and upgradation of systems, KMC was able to resolve the issues. The present document talks about effectiveness of the same.

2. Documentation Methodology

The practices adopted for improving efficiency of water supply were identified during secondary data collection regarding Water Supply and Sanitation (WSS) under Performance Assessment System Project. Basic analysis of this data indicated that initiatives of KMC are effective and impact is also visible. Hence, it was decided that detailed documentation could be undertaken for the purpose of wider dissemination. Both qualitative and quantitative data was collected and is as follows:

- Detailed discussion with KMC officials on specific initiatives under water supply.
- Field visits
- Brief interviews of slum dwellers
- Focus Group Discussion with slum dwellers

Moreover, on-site photographs and audio-visual clips were taken to enhance effectiveness of documentation. This was supported by collection of newspaper clippings and synthesizing information from documents related to technology used, relevant Government Resolution (GR), etc.

3. Background of Karad Municipal Council (KMC)

Karad is situated in Satara district of Eastern Maharashtra on the confluence of Krishna and Koyna rivers. This beautiful city with a rich historical background is known for its business activities, providing good educational facilities, and is therefore, a favored destination of many.

The KMC was established on 15th September 1855. It is a 'B' class council with an area of 3.15 sq. km. and current estimated population of 66,269[3]. (Census 2001 population was 56,161).

Many initiatives had been taken due to development oriented political leadership. KMC has adopted and initiated various government schemes and projects e.g. underground sewerage system, augmentation of water supply, water quality test at consumer end, automatic flow meters, and public toilets for physically challenged people, etc. These schemes have been successfully executed by the ULB.

Box 1: Objectives

- Increasing efficiency of water supply system
- Increase coverage
- Reduce expenditure on service delivery
- Compliance with GR
- Improving quality of water

4. Need for Present Initiatives at KMC

The need was felt at KMC to undertake concrete steps for improving and upgrading the water supply systems for following reasons:

- **Excess expenditure:**

Previously, the actual water lifted by jack well from Koyna River was calculated on the basis of pump efficiency, discharge and pumping hours. It was estimated that due to this practice, 25 percent times of additional expenditure was being paid. So, there was a need to install computerized Automated Flow Meter (AFM) at the pumping station. Excessive costs were incurred for electricity also since flat charge was levied on usage of electricity. Installation of Automatic Power Control Unit (APFC) could help reduce the costs.

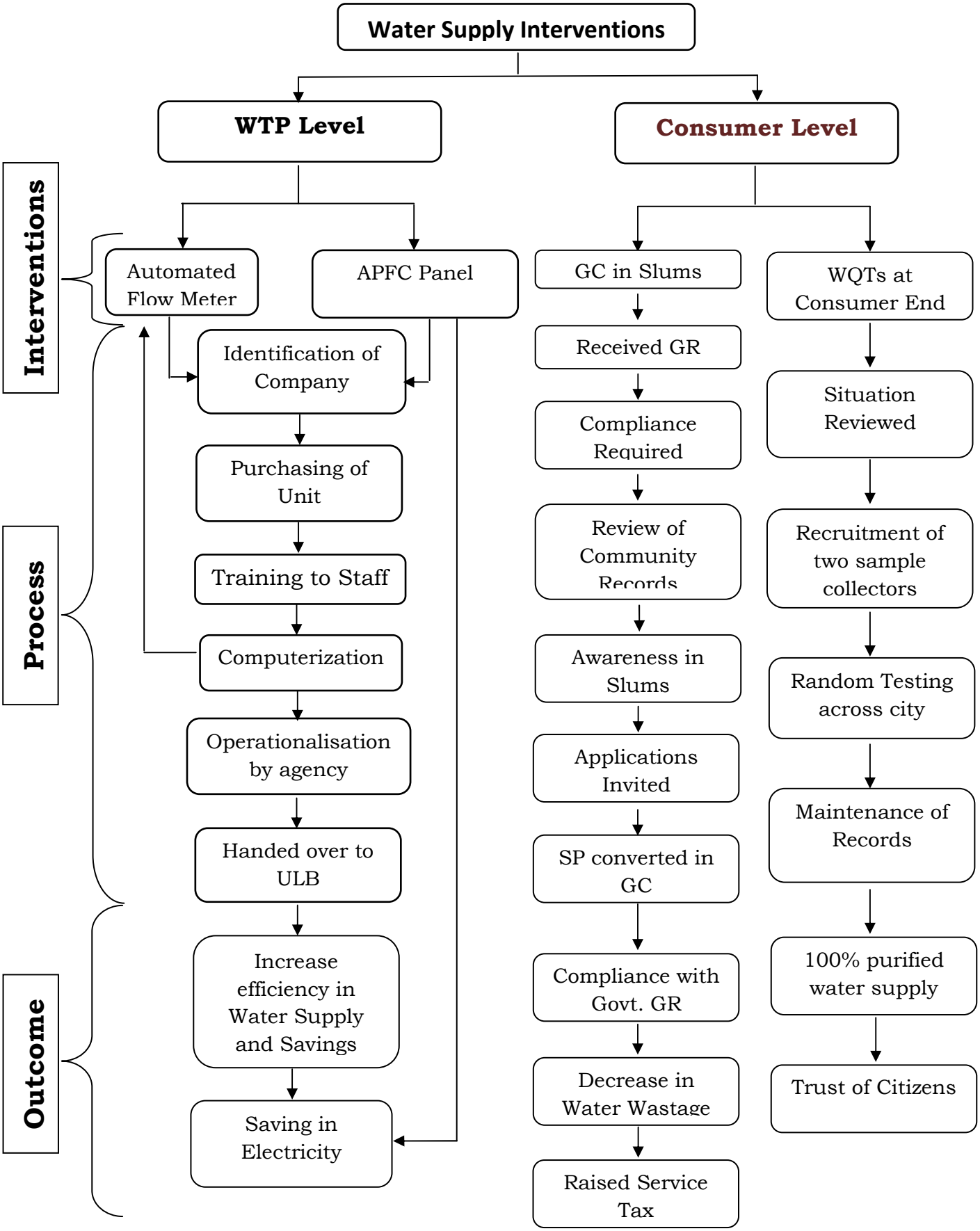
[3] Estimate has been provided by KMC by considering annual growth rate of 2% in the census population of 2001.

- **Improving access in Slums and Compliance with GR regarding Water Supply**
  - A GR regarding water supply (GNT 1096/GR no. 182/96/4) (Annexure 1) was issued in 2002. For compliance of the GR, it was essential to convert stand posts into group connections.
  - The population in Karad was also served by stand posts and as per the new GR, the KMC was required to replace these with group connections. Apart from that, the KMC bore the expenditure for the water consumed. Supply through stand posts led to difficulties in fetching water and wastage at the stand posts. Compliance with the GR would also resolve these issues.

- **Incidence of Epidemics of Water Borne Diseases**

  Recurrent incidences of epidemics of water borne diseases occurred as a result of inadequate purification of water. It was necessary to improve the quality of water to deal with these.

Flow Chart: Interventions for Efficient Water Supply System



5. Operational Mechanism

The roles and responsibilities of the staff in water supply department had to be modified to certain extent to operationalise the strategies for improved water supply systems. A mechanism has been established for undertaking the main activity of water quality tests at consumer end and adherence to regulations. The same is presented in annexure 2.

6. Initiatives and Process

6.1. Installation of Automated Flow Meter at Pumping Station

The KMC purchases water from the irrigation department through Koyna river and since there was no flow meter, it paid water cess as per fixed rates @ Rs. 6.60 (US $ 0.14) per 10,000 liters. A penalty of 1.25 times of actual cess was charged for not installing flow meter. Apart from that, in absence of flow meter, it was not possible to have accurate figures for water usage. In order to deal with this, the KMC installed AFM in the year 2006 at the pumping station at WTP. As a result, it can not only keep a check on water purchased and usage, but it also making savings in cost for purchasing water.

Figure 1 AFM

6.2. Installation of Automatic Power Factor Control Unit (APFC Panel)

The KMC has installed an Automatic Power Factor Control Unit (APFC panel) at pumping station in the year 2006. Due to this, the KMC also receives incentives upto seven percent of energy charges Maharashtra State Electricity Board (MSEB) offers for keeping power factor in unity to customers utilising 25 horse power (hp) units. This has helped KMC to reduce expenses on water distribution.

Figure 2: FMC

6.3. People's Participation for Improving Access of Water to Slum Dwellers

Karad has eight non-notified slums with 221 households and no notified slums.

Figure 3

Replacement of public stand posts with group connections was undertaken to improve access as well as achieve compliance with the GR regarding the same in the year 2002. However, the KMC also wanted to levy charges on group connections and the consumers would have had to undergo official procedures for the same. There was a possibility of resistance for the same. Considering the fact that the subject of water supply is close to the heart of slum dwellers, their participation was sought through various ways.

Awareness generation meetings were conducted and community's views were considered. The community was sensitized about the potential benefits that would outnumber concerns such as levying of charges.

Though prima facie, this may sound a preliminary aspect of people's participation in form of consultation, it is worth highlighting taking into account the earlier sensitivities of the community.

Initially, the KMC officials visited the slums and held meetings with concerned persons. Applications were invited along with identity proof and overdue, if any. Thereafter, 75 group connections of half inch serving 221 households in eight non-notified slums have been provided. A billing system has been established, whereby bill is generated collectively and a flat annual rate has been charged on half inch connection, which is Rs. 1140/- (US $ 24.28). It means each household has to pay only Rs. 228/- (US $ 4.86) per year, which is a nominal cost. This system is being expanded to cover rest of the slums.

6.4. Improving Water Quality

Figure 4
WQT

The practice of water testing for ensuring good quality water supply was in existence previously as well. However, recurrent epidemics of Jaundice and Cholera necessitated further improvement in quality. Hence, testing regimen has been modified in the year 1993 and refined as detailed below.

Efforts have been made for improving water quality both at Water Treatment Plant (WTP) and consumer level. For monitoring the quality of water treated, the council conducts chemical, physical and bacteriological tests at both WTP and consumer level. Chemical tests include tests for pH, total dissolved solids, suspended solids, hardness, nitrate, calcium, iron, etc. These tests are conducted by District Public Health Laboratory (DPH). Ortho Toludiene (OT) tests are conducted at both consumer end and WTP level regularly. Bacteriological tests include Most Probable Number (MPN) of which 60 samples are sent to DPH. Physical test involves alum treatment.

For testing at the consumer level, contractual staff has been appointed for conducting tests door to door. The areas have been assigned to two sample collectors for the same. Total 60 tests are carried out daily, 30 each in the morning evening randomly. The tests records are well maintained by the ULB. (Annexure: 3. The table will show the snapshot of tests conducted by ULB)

All the tests are conducted in well organised manner and reports are maintained. (Annexure 4)

Box 2: Key Results

- Higher efficiency in service delivery
- Real-time database maintained
- Compliance with GR
- Improved access to water supply in slum
- Improved quality of water

7. Impact

- Installing flow meters has facilitated accurate measurement of water lifted. The billing has decreased by 25 percent after installing

flow meters. The KMC has gone a step ahead by attaching computers to this system and database is being maintained.

- Use of APFC has reduced electricity costs of Rs. 17583.3 (US $ 374.55) per month.
- After provision of group connections in slums, KMC has provided 75 group connections in the slum area.
- The quality of water has improved considerably. There has been no incidence of epidemic since last 17 years.
- Recognitions – As a result of such strategic interventions, KMC was awarded and is being recognized as one the efficient MCs in context of water supply.

8. Monitoring

- Water testing at consumer level is monitored meticulously.
- Monthly survey of hospitals to check any epidemic evidences due to water is conducted by ULB.
- Quality check of reagents used in the tests.

9. Enabling factors

- Staff of the KMC is self-motivated, keen to adopt technology and open to peoples' participation.
- KMC was able to raise sufficient funds for all the interventions.
- The right approach of intervention in community through creating awareness amongst slum dwellers by organising area sabhas and meetings with them.

10. Constraints Faced and Overcome

The task of providing group connection was not without its difficulties. Initially, the slum dwellers opposed this as they had to pay money for the connection. This was overcome by building rapport with the community and gaining their active participation. The community finally accepted the change since it was convinced about the benefits.

11. Financial Aspects

Prior to installing this computerized flow meter, the council was paying lump sum amount along with 25 percent times extra cost to the Irrigation Department. But now they are paying for the accurate figure. Their bill cost has decreased by 25 percent. The exact difference before and after installing of computerized flow meter:

- The KMC incurred capital expenditure of Rs. 6,00,000/- (US 12780.9 $) for flow meter, which was borne through its own funds. However after installing the flow meter, they are paying for the actual cost of water lifted and as a result the revenue income is increasing.
- The KMC met a cost of Rs. 5,00,000/- (US 10650.7 $) for APFC panel. Since the unity power factor is being maintained for three consecutive years, it has been receiving an incentive of 7 percent on electricity charges, thus saving approximately Rs. 2,11,000/- per annum (US $ 4494.63). It is getting an incentive of approximately Rs. 17583.3/- (US $ 374.551) per month and till date the council has recovered the capital expenditure. Hardly, any maintenance costs have been incurred till date.
- For improving the quality of water, the KMC is doing testing at consumer end. Due to this, the annual costs have increased by Rs. 1,02,000/- (US $ 2172.75) as for conducting the tests KMC has appointed two tests collectors. But since this has had a positive impact on public health, the costs are being justified by the KMC.
- However, KMC is charging Rs. 1140/-(US $ 24.2837) for group connections in slums, which were previously free of cost in form of stand posts. But now KMC is getting an income of Rs. 85,500/- (US $ 1821.28) per annum.

12. Futuristic

- At present seven stand posts are still in some slums of KMC. The KMC is vying to convert rest of these stand posts into group connections.
- Provide 24*7 water supply.
- Metering of all water connections, both individual and group.

13. Replicability

This good practice has higher replicability as:

- Funds required for the flow meter and APFC are one time and there have been no major maintenance costs for the same in last three years. In order to meet the costs, multiple sources can be tapped if ULB's own resources are not sufficient, e.g., fund's from 13th Finance Commission, private partnership, convergence with schemes like Maharashtra Sujal and Nirmal Maharashtra Abhiyan (MSNA), Jawaharlal Nehru National Urban Renewal Mission (JnNURM), Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) etc.
- No major infrastructure is required for conducting water quality tests.
- Community participation and mobilisation can be done with the help of Community Based Organisations (CBOs), Swarna Jayanti Shahari Rojgar Yojana (SJSRY) staff, etc. since they have direct access and relationship with community.

14. Learnings

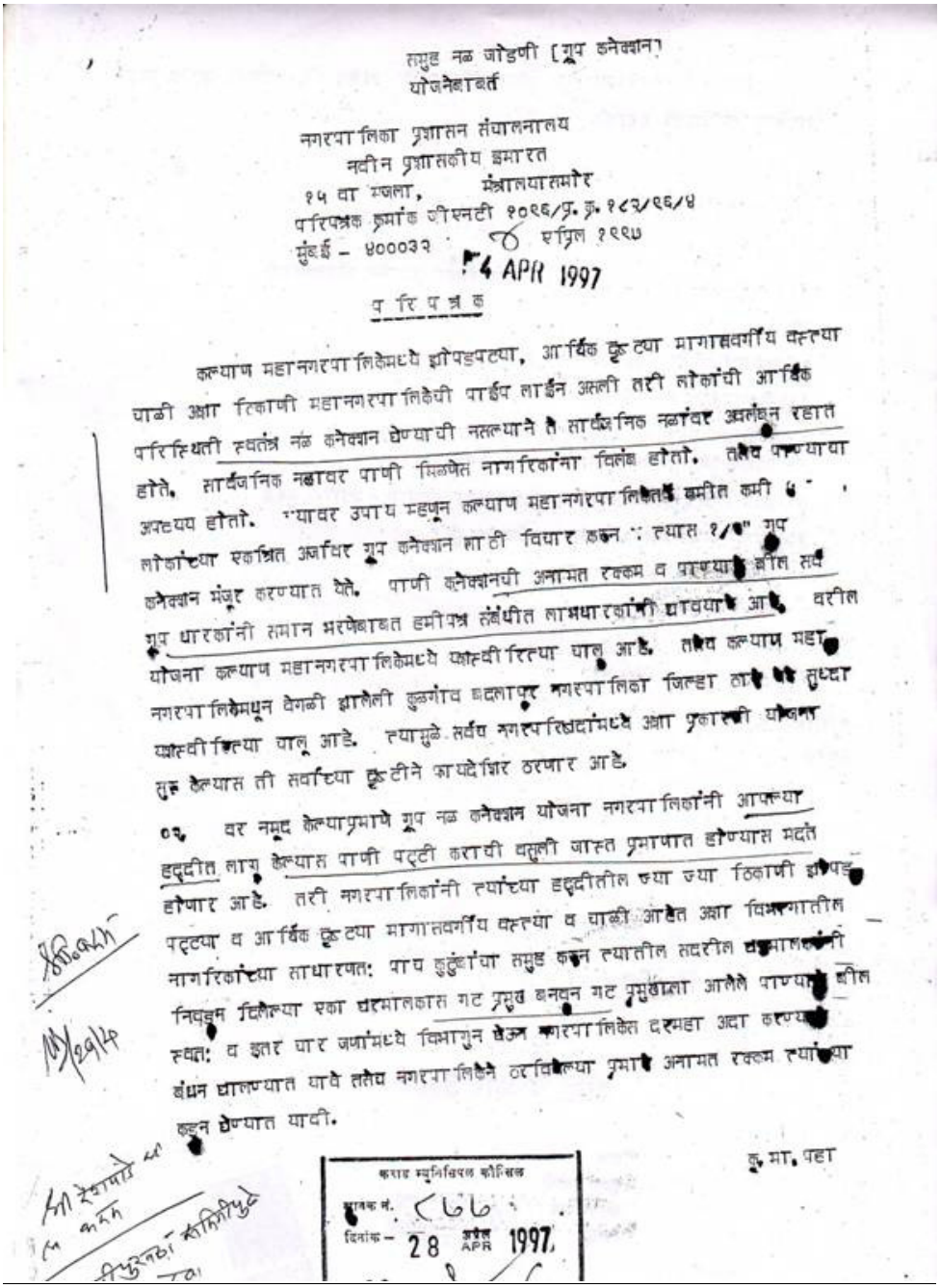
- The ULB officials need to be flexible and have a futuristic view regarding service delivery. There has to be a willingness to accept upcoming technology for improved services.
- People's participation is a must in cases, where equity issues are involved and the upgradation of services has financial implications.
- The concerned staff addressing the equity issues should be sensitive towards importance of participatory development and imbibe/utilise participatory skills.
- Group connections are preferable over stand posts (if individual connections are not feasible) since they improve access and also generate revenue.
- Simple technological initiatives at appropriate junctures can not only bring in efficiencies but also reduce expenditure.

Conclusion

The initiatives taken by KMC have helped in achieving the objective of increasing efficiency, improving access to deprived section and improving quality and coverage of water supply. Apart from that, compliance with GR related to water supply has also been achieved. The focused efforts, motivation of the KMC, participatory approach and people's participation have brought about this change very effectively.

Annexure 1

Government Resolution (GR) regarding Conversion of Stand Posts into Group Connections



समुह नळ जोडणी (ग्रुप कनेक्शन)
योजनेबाबत

नगरपालिका प्रशासन संचालनालय
नवीन प्रशासकीय इमारत
१५ वा मजला, मंत्रालयासमोर
परिपत्रक क्रमांक जीएनटी १०९६/प्र.क्र.१८२/९६/४
मुंबई - ४०००३२ ७ एप्रिल १९९७

4 APR 1997

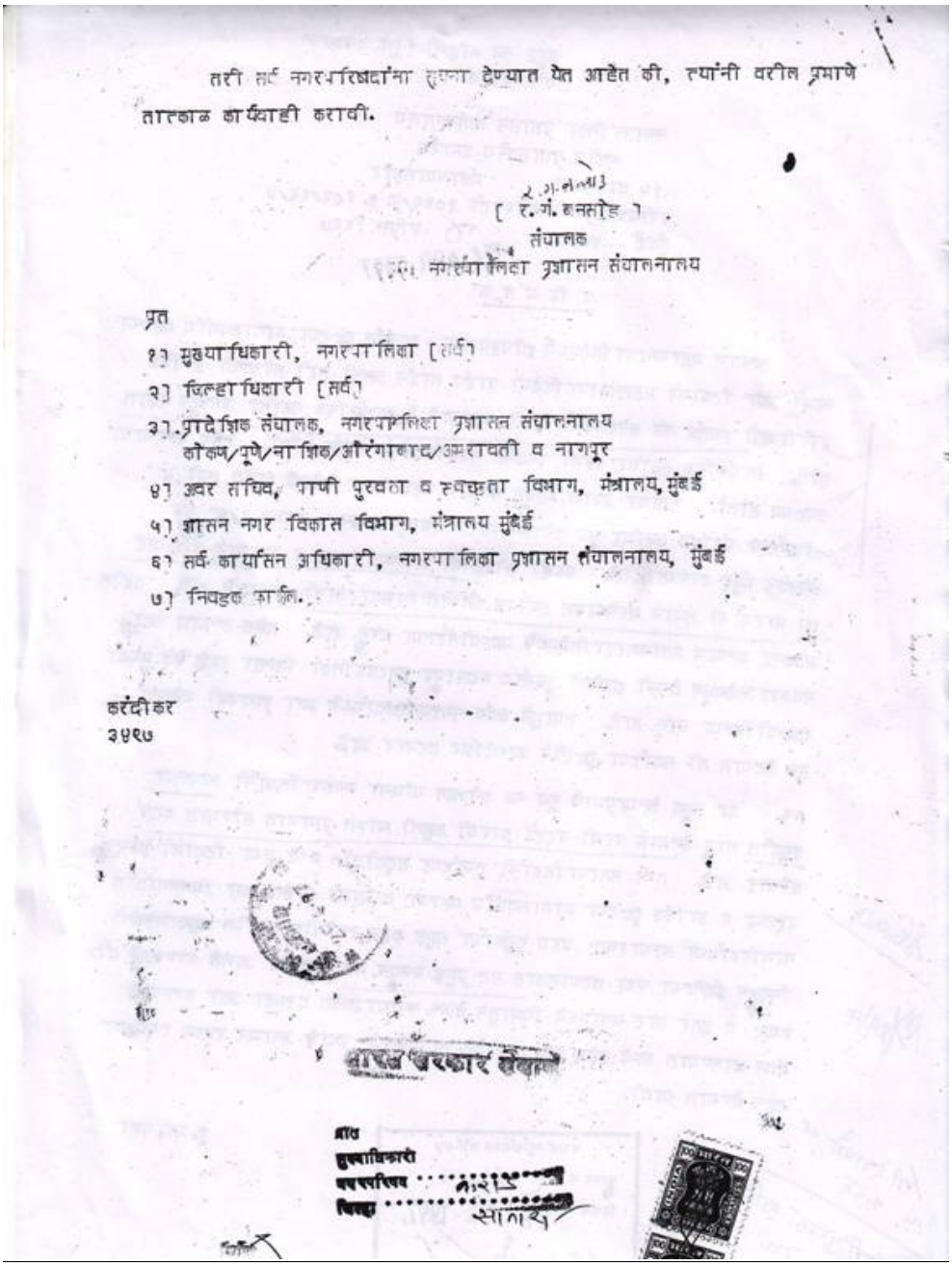
प रि प त्र क

कल्याण महानगरपालिकेमध्ये झोपडपट्या, आर्थिक दुर्बल्या मागासवर्गीय वस्त्या वाढी अशा ठिकाणी महानगरपालिकेची पाईप लाईन असली तरी लोकांची आर्थिक परिस्थिती स्वतंत्र नळ कनेक्शन घेण्याची नसल्याने ते सार्वजनिक नळांवर अवलंबून रहात होते. सार्वजनिक नळावर पाणी मिळणेस नागरिकांना विलंब होतो. तसेच पाण्याचा अपव्यय होतो. ह्यावर उपाय म्हणून कल्याण महानगरपालिकेत काही कमीत कमी ५ लोकांच्या एकत्रित अर्जावर ग्रुप कनेक्शन साठी विचार करुन त्यास १/४" ग्रुप कनेक्शन मंजूर करण्यात येते. पाणी कनेक्शनची अनामत रक्कम व पाण्याचे बील सर्व ग्रुप धारकांनी समान भरणेबाबत हमीपत्र संबंधीत लाभधारकांनी द्यावयाचे आहे. वरील योजना कल्याण महानगरपालिकेमध्ये यशस्वीरित्या चालू आहे. तसेच कल्याण महानगरपालिकेमधून वेगळी झालेली डुलगाव बदलापूर नगरपालिका जिल्हा ठाणे येथे सुध्दा यशस्वीरित्या चालू आहे. त्यामुळे सर्वत्र नगरपरिषदांमध्ये अशा प्रकारची योजना सुरु केल्यास ती सर्वांच्या दृष्टीने फायदेशिर ठरणार आहे.

०२. वर नमूद केल्याप्रमाणे ग्रुप नळ कनेक्शन योजना नगरपालिकांनी आपल्या हद्दीत लागू केल्यास पाणी पट्टी करापी वसुली जास्त प्रमाणात होण्यास मदत होणार आहे. तरी नगरपालिकांनी त्यांच्या हद्दीतील ज्या ज्या ठिकाणी झोपडपट्ट्या व आर्थिक दुर्बल्या मागासवर्गीय वस्त्या व वाढी आहेत अशा विभागातील नागरिकांच्या साधारणत: पाच कुटुंबांचा समुह करुन त्यातील सदरील प्रमाणे निवडून दिलेल्या एका घरमालकास गट प्रमुख बनवून गट प्रमुखाला आलेले पाण्याचे बील स्वत: व इतर चार जणांमध्ये विभागुन देऊन नगरपालिकेत दरमहा अदा करण्याचे बंधन घालण्यात यावे तसेच नगरपालिकेने ठरविलेल्या प्रमाणे अनामत रक्कम त्यांच्याकडून घेण्यात यावी.

कु. मा. पहा

कराड म्युनिसिपल कौन्सिल
आवक नं. ८६६
दिनांक - 28 APR 1997



तरी सर्व नगरपरिषदांना सूचना देण्यात येत आहेत की, त्यांनी वरील प्रमाणे तात्काळ कार्यवाही करावी.

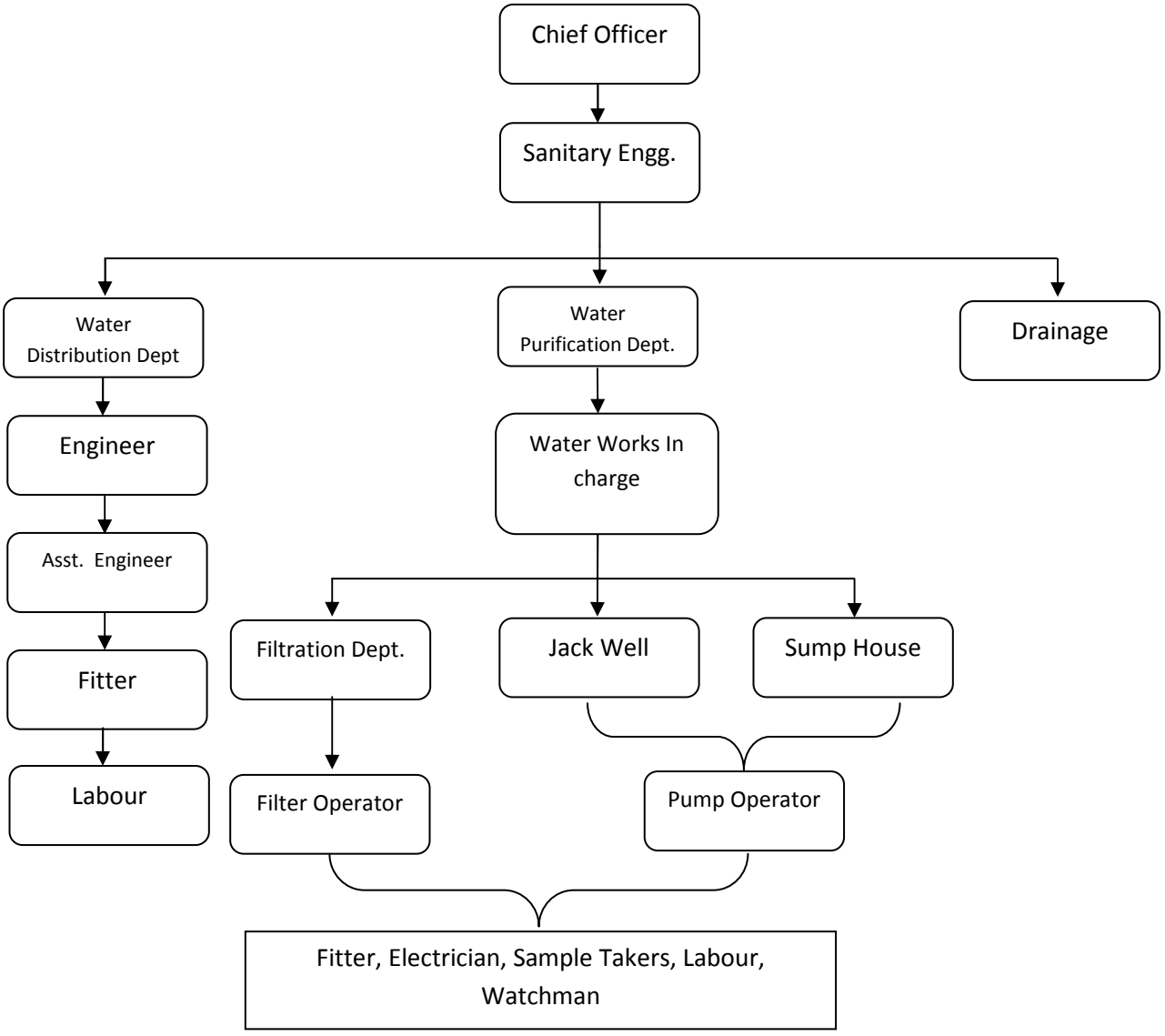
(र.गं. कनसोड)
संचालक
नगरपालिका प्रशासन संचालनालय

प्रत
१) मुख्याधिकारी, नगरपालिका (सर्व)
२) जिल्हाधिकारी (सर्व)
३) प्रादेशिक संचालक, नगरपालिका प्रशासन संचालनालय कोकण/पुणे/नाशिक/औरंगाबाद/अमरावती व नागपूर
४) अवर सचिव, पाणी पुरवठा व स्वच्छता विभाग, मंत्रालय, मुंबई
५) शासन नगर विकास विभाग, मंत्रालय मुंबई
६) सर्व कार्यासन अधिकारी, नगरपालिका प्रशासन संचालनालय, मुंबई
७) निवडक कार्ड.

करंदीकर
३४९७

Annexure 2

Flow Chart of Operational Mechanism



Annexure 3

Table : Water Quality Tests Conducted at Karad Municipal Council

Sr. No.	Test Name	Frequency of Tests	Annual Tests	Tests done by
1	PH Test	As per requirement	----	Filter Operator
2	OT Test	Every 1 hrs	As per schedule	Filter Operator
3	Jar Test	Every Morning	10,950	Filter Operator
4	Alum Dose Test	Every Morning (Thrice a day in rainy season)	10,950	Filter Operator
5	OT test (At consumer end)	30 in morning and 30 in evening	21,900	Two Sample Takers
6	Microbiological Test (at Water Works Dept)	Every Thursday 8 tests and Every Monday 8 tests	704	District Health Lab.

Annexure 4

Copy of Test Report done at Consumer End

कराड नगरपरिषद, कराड.

जलशुद्धीकरण केंद्र, कराड.

वार : रविवार
दिनांक : ७/८/२०१०
वेळ : सकाळी

अ. नं.	कनेक्शन धारकाचे नांव व पत्ता	ओ. टी. टेस्ट	स्वाक्षरी	शेरा
१	[illegible] वार्ड	Open	[illegible]	
२	[illegible] वार्ड	Open	S.P.B	
३	[illegible] वार्ड	Open	सौ आर. पी. पवार	
४	[illegible] वार्ड	Open	[illegible]	
५	[illegible] वार्ड	Open	[illegible]	
६	[illegible] वार्ड	Open	कांबळे	
७	[illegible] वार्ड	Open	[illegible]	
८	[illegible] वार्ड	Open	सौ [illegible]	
९	[illegible] वार्ड	Open	सौ पवाडकर	
१०	[illegible] वार्ड	Open	[illegible]	
११	[illegible] वार्ड	Open	[illegible]	
१२	[illegible] वार्ड	Open	[illegible]	
१३	[illegible] वार्ड	Open	सौ [illegible] मुढेकर	
१४	[illegible] वार्ड	Open	[illegible]	
१५				

ओ. टी. टेस्ट घेणाऱ्याचे नाव

गाळणी निरिक्षक
नविन जलशुद्धीकरण केंद्र, कराड.

लॅब इनचार्ज
नविन जलशुद्धीकरण केंद्र, कराड.

परिक्षण : शहरातील केन लिकेज

१) नांव : _____ पत्ता : _____
२) नांव : _____ पत्ता : _____
३) नांव : _____ पत्ता : _____