Change in drinking water quality from catchment to consumers during urban water supply: A study from India

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AIMS & OBJECTIVES

- Assessment of the present status of SDWQ program in selected cities
- Identification of deficiencies in the existing system
- Action plan for improving the SDWQ program
- Preparation of guidelines for initiating suitable measures
Sampling Schedule

- Water quality analysis for 3 Seasons & 7 Consecutive days
  - Raw water sources
  - Treatment plants
  - Distribution system
  - Consumer ends.
- Representative
- Uniformly distributed
- Proportional to the number of inhabitants
- The sampling points:
  - Outlet of WTP, storage reservoirs, & distribution reservoirs
  - Representative points of primary distribution network
  - Service points of secondary distribution network
  - Domestic containers
Distribution of Cities based on Population

- > 60 Lakhs: 32%
- 20 - 60 Lakhs: 18%
- 10 - 20 Lakhs: 12%
- 1 - 10 Lakhs: 3%
- < 1 Lakhs: 3%
Percent Population Served with Water Supply

- 33%
- 41%
- 19%
- 7%

Legend:
- 100
- 80 - 100
- 60 - 80
- 40 - 60
Present Status of Surveillance

- **Leak Detection**
  - Adequate: 44.1%
  - Inadequate: 64.7%

- **SDWQ**
  - Adequate: 47.7%

- **Lab facilities**
  - Adequate: 67.6%

**Key:***
- Yes
- No
- Inadequate
- Adequate
Water Supply - Problems of Common Nature

• **Design and O & M**
  – Source selection, design and protection
  – Treatment plant commensurate with site specific need
  – Quality of service
  – Adequacy of service coverage
  – Reliability of service provision

• **Management and Revenues**
  – Need for institutional and fiscal reforms
  – Appropriate pricing policies
  – Community involvement
  – Reliable and dependable information system and data base

• **Results**
  – Large urban poor population lacking access to water and sanitation
  – Rest of the population remains dissatisfied with the facilities
  – Health risk potential through water supply continues
Findings

• All the cities receive intermittent water supply.
• Water supply @ 135 lpcd in 43% cities (below CPHEEO norms).
• The leak detection & waste prevention program: in 35% cities
• Most of the cities have conventional WTPs with surface water sources
• The chemical quality of raw water is within CPHEEO limits.
• No significant change in physico-chemical parameters on day-to-day basis.
• Bacteriological water quality deteriorates during supply

  This may be attributed to:
  ▪ Improper chlorination & monitoring at distribution system & at consumer ends
  ▪ Maintenance of service reservoirs and possibility of enroute contamination
  ▪ Interrupted water supply and tampering with distribution contributed to increased load of microorganisms in distribution lines
Recommendations

- Proper maintenance of distribution network
- Awareness about the hygienic / sanitary conditions around public taps
- Proper storage of water
- Rechlorination at the booster stations.
- Treatment in the household before consumption.

Other recommendations

- Water quality assessment for SDWQ should be totally independent
- Provision of well equipped certified laboratories
- Quality control data must be stored in safe place by the city authority
- Data bank for water quality surveillance and health status
- CPHEEO may periodically review SDWQ.
A Sand filter without filter sand
Clarifier - Flooded due to overloading
Single point addition of coagulants
- Not conducive to effective mixing
Chemical dosing through perforated pipe
- Simple and effective
Reliable flow measuring system
- Prerequisite for plant control
Well equipped laboratory – Vital for effective plant control
Good housekeeping
Thank You