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CHALLENGES OF URBAN WATER CRISIS: A CASE STUDY OF MUNICIPAL COUNCIL, S.A.S. NAGAR, MOHALI (PUNJAB)

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Urban water resource management is tilted heavily in favour of supply expansion in almost complete disregard of a realistic analysis of demand management and use efficiency. The ill-managed organizations and systems add to citizens' woes besides the ever-increasing shortages in water supply. This article, based on a case study, focuses on the water supply mismanagement issues that have emerged common to almost all local bodies and suggests reforms in urban water sector and emphasises the need for a better coordination among various bodies entrusted with the task.

WATER IS the most vital natural resource available on this planet and it is being harnessed by the mankind to sustain all types of life, viz, human, animal and plant. It has been well said that water is life's matter and matrix, mother and medium, nay, water is life itself.

The history of ancient civilisation reveals that the earliest man lived in close proximity to water sources as evidenced by human settlements such as those found along the great lakes of East and Central Africa, rivers, such as Euphrates and Tigris in ancient Mesopotamia, Nile in North Africa, and Indus in India.

This is corroborated by the importance the Greek Philosopher Pinder (5th century, BC) attached to water, who once said, "water is the best of all things". The importance of water in earlier civilisation was also succinctly portrayed by another Greek Philosopher Empedocles of Agrigcentum (490-430 BC), that water is one of the four primary elements, namely, water, fire, air and earth, and among these water is the pillar of all things.

In contemporary times, major cities such as New York, Tokyo, Hong Kong, have their origin traced near major water sources, where they evolved and sustained over the years as a result of continued availability of this means of survival.

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Thus, water is one such input without which no civilisation can survive. So, in the present context, the major thrust in many countries of the world including India, is to ensure the provision of adequate and potable water to their urban populations.

Water Resources

Planet earth has above three-fourth of its surface covered with water. 97.3 per cent of it is available in the form of sea water and hardly 2.7 per cent is fresh water, of which 1.74 per cent is in the form of glaciers, drawing about total 7,000 cubic meter per capita renewable fresh water.

India roughly accounts for about 2.5 per cent of the land mass and 4.5 per cent, fresh water resources. According to the report of the high level National Commission for Integrated Water Resource Development Planning (NCIWRDP), set up in 1999 by the Ministry of Water Resources India, the estimates of water resources are:

TABLE 1: ESTIMATES OF WATER DRAWN FROM AVAILABLE WATER RESOURCES

Water Resources	Water in Cubic km
Available surface water	: 1953
Available ground water	: 432
Total surface and ground water	: 2385
Usable surface water	: 690
Usable ground water	: 396
Total usable water	: 1086
Precipitation over the Indian Landmass	: 4000

From Table 1 it can be drawn that out of 2385 km³ of total surface and ground water 1086 km³ is usable surface and ground water against the precipitation of 4000 km³. Thus, a large gap exists between the demand and supply of water.

Rapid Urban Growth and Increased Water Demand

The urban population is growing at an average growth rate of 35 per cent and presently, the urban population is estimated to be 25 per cent of the total population which figure is expected to touch 60 per cent by the year 2025. India's urban population has grown more than five times from 62 million to 326 million from 1951 to 2001.

Thus, it can be argued that urbanisation has been taking place at a very rapid pace in India. This phenomenon can be attributed to multiple factors, such as migration from rural to urban areas, industrialisation, development of trade, centralisation of administration and growing educational and employment opportunities.

The increase in population not only generates greater demand for water, but it also creates problems related to the quality of water and hence to the

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general health of the people. According to experts, population growth creates water shortages not only by adding the number of consumers but also by increasing population density beyond the level that nearby water supplies can serve.

Water Coverage

The United National Conference on Human Settlements held in June 1976 at Vancouver recommended that safe water supply and hygienic waste disposal should receive high priority from national governments and international agencies so as to enable national governments to achieve targets of serving the whole population by 1990. The objectives were further reiterated in the UN Water Conference held at Mar de Plata, Argentina in 1977. It was declared that the period of 1981-90 be designated as the International Drinking Water Supply and Sanitation Decade (IDWSSD). The conference recommended closer cooperation between international organisations and increased technical and financial assistance from external, bilateral and multilateral agencies. The 31st UN General Assembly approved the recommendations and India had pledged its full support for the IDWSSD Programme. Consequently, the IDWSSD Programme was launched in India on April 1, 1981 with a view to achieve definite targets by the end of the decade. Recognising the need for coordinated action and approach to achieve the decade goals, the Government of India constituted three working groups: (i) Financial Resources, (ii) Materials and Equipment and (iii) Programme and Manpower.

At the end of the decade it was found that water coverage in urban areas improved from 72.3 per cent to 84 per cent during 1981 to 1990. Later, in the year 2001 the reported level stood at 89 per cent and recently in 2004 it has gone up to 91 per cent.

In quintessence, it can be concluded that despite achieving unique and positive results during the decade, the continuing increase in population has been posing a great challenge, which has to be met. Moreover, the poorer sections of society have yet to be served. The focus should therefore be at not mere increase in aggregate coverage but coverage which focuses on the unserved and underserved segments of the population.

Water Pollution

One of the most serious problems before the water policy makers in India is the severity of its polluted water. According to experts in India, a staggering 70 per cent of the available water in India is polluted, and an estimated 73 million workdays costing Rs. 60 million are lost every year due to water related health problems. As per the WHO, 80 per cent of the diseases are water borne like diarrhoea, typhoid, jaundice, cholera, dysentery, etc.

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Three primary sources of pollution have been identified: (i) discharging of industrial effluents, (ii) dumping of untreated sewage (which is responsible for 90 per cent of the pollution), (iii) contamination of underground water from chemical fertilizers and pesticides. These factors lead to inefficient use of water resources, which results into water shortages.

In 1974, the Indian Government, enacted the first major law related to water pollution – the Water Act of 1974. With its broad scope, the Act covered all physical, chemical and biological aspects of water pollution and damage not only to human lives but also to plants, animals and aquatic organisms. The Act also specified penalties for various offences but unfortunately, it turned out to be inefficient due to bureaucratic corruption, mass apathy, feudalistic economy, and the clout of industrialists.

National Water Policy

In 1977, the UN Water Resources Council adopted Mar del Plata Action Plan which recommended that every country should formulate national policies for use, management and conservation of fresh water. Each programme should include research activities, appropriate institutional structures and laws for accelerating development and orderly administration of water resources. It took India about 10 years to catch up with these recommendations by adopting the National Water Policy in 1987. Under the Policy, highest priority was assigned to drinking water, followed by irrigation, hydro-power, navigation and industrial uses, etc. It further recommended that the quality of surface water and ground water should be monitored. However, mere adoption of National Water Policy did not improve water-related situation in India and increased water demand for irrigation, domestic and industrial consumption and water pollution necessitated a change in the administrative structure.

Thus, in October 1985, erstwhile Department of Irrigation was redesigned as Ministry of Water Resources. Its primary responsibility was to develop, conserve and manage water as a natural resource. It was also responsible for formulating broad policy guidelines and programmes for development and regulation of water resources. It included sectoral planning, coordination of policies and various boards and state level efforts, technical examination and assistance in water resource projects.

The National Water Policy 2002, emphasised the need for an integrated approach to water resources by planning, development, conservation and management of water with a national perspective; adoption of integrated and multi-disciplinary approach for implementation of projects; water sharing guided by a national perspective with due regard to water resources availability and needs within the river basin.

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However, in the absence of an effective and meaningful institutional arrangement for planning and management of water resources, the National Water Policy has remained but a pious statement of intent.

Financial Allocations

As far as the financial allocation on water supply is concerned under Five Year plans, the total outlay for urban water supply and sanitation, which was Rs. 43 crore under the First Five Year Plan, enhanced to Rs. 550 crore by the Fifth Plan. But despite a rapid increase in the urban population in the ensuing years, there has been a gradual shift in priority from urban to rural sector from the Sixth Plan onwards. The percentage share to the sector out of the total public sector outlay only showed a marginal increase from 1.28 per cent to 1.38 per cent between First and Eighth Plans. In the Ninth Plan, the share dramatically improved to 2.17 per cent.

In the Tenth Five Year Plan, based on the recommendations of the group on urban water supply and sanitation constituted by the Planning Commission, the requirements of the funds for achieving population coverage was cent per cent with drinking water facilities and 75 per cent sewerage and sanitation facilities in the urban area.

	Xth Plan	XIth Plan (Rs. in crore)
Water supply	28,240	53,666
Sanitation	25,479	55,380
Total	53,719	1,09,046

The Tenth Plan outlay for urban water supply, rural water supply and urban sanitation and rural sanitation under the state sector is Rs. 44206.55 crore. Under the Central sector, the outlay for urban development is Rs. 12,161.45 crore which includes Rs. 900 crore for extension of Accelerated Urban Water Supply Programme to small towns, Rs. 299.35 crore for sanitation and Rs. 10 crore for transport. There is a Central sector outlay of Rs. 700 crore for north-eastern states also.

Under Eleventh Five Year Plan the amount sanctioned under water and sanitation has been almost twice the amount sanctioned under Tenth Plan. Hence, it can be drawn that efforts have been made in the direction of improving financial allocations on water supply, the improvement in terms of water coverage is marginal. However, the situation still portrays a grim picture, since nearly 10 per cent of the urban population remains without access to water supply against the targeted goal of cent per cent water coverage in urban areas. Thus, it can be said that despite achieving unique and positive results in terms of water coverage, the continuing growth of urban population in India would continue to pose growing challenges, which

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have to be met through proper planning and management of available water as well financial resources.

Water Supply in S.A.S. Nagar (Mohali)

Situated in the vicinity of Chandigarh, S.A.S. Nagar (Mohali) was created in 1966 after the creation of Chandigarh as Union Territory and the capital of Punjab and Haryana. Now, it is a newly created district of Punjab spread over an area of 23.86 sq. km. having a population of 1,23,484. Earlier, it was a sub-division under Anandpur Sahib till 13, 2006 at the time of Baisakhi festival in the region, declared S.A.S. Nagar (Mohali) as 18th district of Punjab.

Water supply is one function which is being performed by the Municipal Council in collaboration with the Public Health Circle, S.A.S. Nagar. Public Health Circle, has been the serving residents with water since its creation in 1985. It has been covering around 90 per cent of the population. The circle caters to the needs of the residents of following area: (i) all the 15 residential phases, (ii) industrial phases (1-5), (iii) Shahi Majra, Matour and Mohali Villages.

Before the creation of Municipal Council S.A.S. Nagar all the functions relating to water supply were being performed by the Public Health Circle S.A.S. Nagar. But due to shortage of staff, some of the newly created areas, i.e. from Industrial Area Phase-6 to Industrial Area Phase-9 were transferred to the Council with its creation in 1995. Thus, a very smaller area is being served by the Council, due to which no outsourcing has yet been introduced in this area.

Apart from supplying water to the residents, the Council is responsible to sanction water connection, collection of bills and responding to the complaints of consumers.

Objectives of the Study

- (i) To study the adequacy of water; and
- (ii) To study the procedural difficulties faced by residents in getting water connection

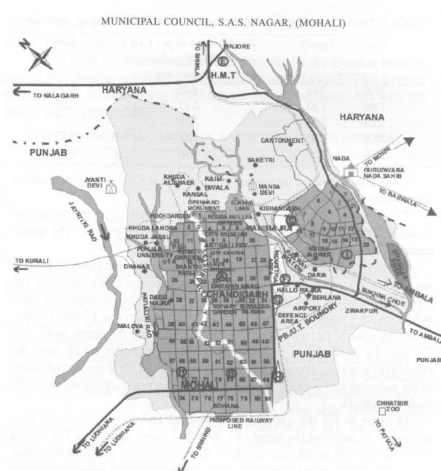
Methodology

The present study was based on both primary and secondary data. For the purpose of collecting the primary data, a questionnaire for citizens, was prepared. Multi-stage stratified random sampling was applied for the selection of respondents. As many as 100 industrial units (constituting about 10 per cent of the universe) were selected randomly representing all types, viz, large, medium and small units.

The secondary data included relevant research books and journals. Other secondary sources like government reports, surveys and unpublished

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doctoral dissertations were also used.

Method of Observation: Personal observation by the authors during visits to different areas of the city has provided reliable information in collecting data.

Major Components of Water Supply in S.A.S. Nagar (Mohali)

- (i) Water Resources
- (ii) Water Connection
- (iii) Collection of Bills
- (iv) Listening to the complaints of citizens

Water Resources

The Council is responsible for catering to the needs of industries, where supply is through tubewells only. It has total nine tubewells drawing about two MG of water per day.

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TABLE 2: TOTAL SUPPLY AND REQUIREMENT OF WATER (IN MGD) 1995-2008

Year	Supply	Requirement as per GOI's norm of 5400 gallons per acre per day	Gap
1995	0.44	4.49	4.05
1998	1.10	5.17	4.07
2001	1.55	5.78	4.23
2005	2.00	6.67	4.67
2008	2.29	8.56	6.27

Table 2 indicates the increasing gap between the supply and demand of water from 1995 to 2008.

The majority of respondents (85.0 %) are not satisfied with the supply of water. Dissatisfaction is found in all the industrial phases. The major cause of dissatisfaction is low pressure of water.

The respondents are mainly from industries. As such these industries are considered as 'dry industries', they do not require much water for the type of production and activities they carry out. The examples of such industries are – manufacturing of tractors, telephones, wires, furniture items, revolving chairs, geysers, inverters, metal products, car spare parts, etc. Though the dependence of these industries on water is much less, the employees working complain that water is supplied for three to four hours in the morning and evening. During this time, the pressure is too low to fill their containers.

In order to fill the gap between demand and supply of water, it is necessary to augment the supply by installing more tubewells. For this, a total of 22 tubewells are needed. Installation of a tubewell costs approximately Rs.16 lakh and running expenses including maintenance and power bills costs Rs. three lakh annually. So installation of 22 tubewells would cost approximately Rs. 4.18 crore to the Council.

As far as the problem of low water pressure is concerned, it can be tackled by replacing the old and rusted pumping machinery and pipelines which decelerate the pace of water. Leakages in pipelines also affect the supply and result into low water pressure. According to one of the findings of the Karnataka Government's World Bank funded project on water supply improvement (2004), due to leakages on an average, 30 to 50 per cent of urban water is wasted. Empty and leaking pipelines are prime breeding ground for bacteria during non-supply hours.

So, there is a need to check leakages regularly. For this, Junior Engineer should be given responsibility of giving weekly report to Sub-divisional Engineer (SDE) regarding such leakages falling under his area. Presently, there is no such system of detection of leakages in place. The only way

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of knowing about leakage is through citizens complaints.

Water Connections

A total of 881 connections have been provided by the division through one water works situated at Industrial Area Phase-7. The overall responsibility of sanctioning water connection to consumers lies with the Municipal Engineer (ME).

TABLE 3: THE TOTAL NUMBER OF WATER CONNECTIONS (1995-2008)

Year	No. of Connections
1995	605
1998	692
2001	771
2005	881
2008	923

Table 3 clearly indicates an increase from 605 connections in 1995 to 923 connections in 2008.

For getting a water connection, the consumer has to fill a form and attach certain documents in a file such as a copy of building plan, power of attorney, industry registration certificate, allotment letter, possession letter, and affidavit claiming the total work force in industry and the receipts of deposited amount for road cutting. The form along with these documents has to be submitted to the office of S.D.E. situated at Industrial Area Phase-7, where file is submitted to concerned clerk, who after verifying the documents passes it to J.E., who then forwards it to S.D.E. for approval. On getting approval from the S.D.E., file goes to the office of M.E. situated at Phase-9 for final sanction.

Problem Areas

As far as the satisfaction of citizens is concerned, they are highly dissatisfied with the procedure of getting water connection because:

First, the majority of respondents (89.0 per cent) are dissatisfied with the time period of getting water connection as it takes around three weeks. The main reason for their dissatisfaction revolves around the dilatory and cumbersome procedures that are followed for getting connection, as the residents are required to pay a number of visits to the offices of S.D.E. and M.E. to enquire about the status of their files. And sometimes the files are lost in the process, and then the consumer again has to approach these offices/officials.

Second, major chunk of respondents (86.0 per cent) faced difficulties on account of rigorous rules and regulations to be followed for getting water connection as the rules are neither specified nor publicised anywhere.

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Though a check list is provided by the department, it does not ensure clarity. It only specifies the list of documents to be attached with the application form. But it does not mention anywhere about issuing authority of these certificates. Lack of clarity leads to confusion in the minds of consumers and whenever any document is unattached, they are rebuked by the consumer unfriendly officials. The required procedure is much more cumbersome for the residents of villages for most of them are uneducated and ignorant about the required administrative procedures to be followed. The tale of woes does not end here as the consumers have to meet a number of officials to get their application forms sanctioned. And the officials are rarely available because of their preoccupied official duties/responsibilities.

To overcome the problem of paying visits to the offices of Council situated in different parts of the city and enquiring about the status of files by the consumers, the system should be centralised, i.e. single window system should be adopted in providing all types of connections whether it is water or electricity connection; *Secondly*, the power of sanctioning water connection may be transferred from the Municipal Engineer to S.D.E. As the M.E. has been vested with the power of sanctioning water connection on the basis of the report received from the office of S.D.E. If S.D.E. gets this power, the time will be saved and it will also save consumer from approaching the office of M.E.

Thirdly, the difficulties of citizens are associated with attaching too many documents (as mentioned earlier, with the application form for getting water connection. The citizens complained that industry registration certificate is issued by the Punjab State Industrial Development Corporation, for establishing industries in the state on the basis of the certain documents such as building plan, power of attorney, allotment letter, possession letter, and affidavit claiming the total work force in industry. And when industry registration certificate is attached for getting water connection, what is the need of asking for these documents again. Therefore, it is suggested that industry registration certificate and receipt of deposit of road cutting charges should be required to be submitted with the application form. This would help in avoiding too much of paperwork and thus simplifying the procedure.

Fourthly, The citizens (59.0%) faced difficulties due to discourteous behaviour of the staff of Council. As they asserted that their behaviour is not helpful towards them in solving their difficulties.

(i) The major causes of dissatisfaction with the behaviour of staff are the delays and the unavailability of the concerned officials as the majority of them opined that it is very difficult to get things done quickly and timely in public dealing offices like Council where the employees are always

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busy in chatting among themselves. *Secondly*, it is very difficult to locate place/person from where one can get information and the available functionaries are unable to tell about the whereabouts of the missing one. So, they are 'shuttled' from one employee to other.

(ii) Those who are dissatisfied with the behaviour of municipal staff reiterated that it is impossible to get things done in the Council unless you have personal relations with one or the other employee.

The major reason found behind such indifferent behaviour towards general public is staff crunch due to which the burden falls on the existing staff. So, their conduct does not reach up to the expectations of the citizens.

(iii) Water Usage Charges

Water usage charges in Mohali are as under:

TABLE 4: WATER USAGE CHARGES IN S.A.S. NAGAR (MOHALI) 1995-2005

Year	(in Rs. per kiloliter)	
	Residential Charges	Commercial Charges
1995	0.70	3.00
1999	1.80	5.00
2005	3.20	6.00

It can be inferred from Table 4 that the water usage charges have increased from 70 paise to Rs. 3.20 per kiloliter for domestic use and from Rs. 3.00 to Rs. 6.00 per kiloliter for commercial use during 1995 - 2005.

Expressing their indignation over high tariff hike, the citizens suggested that the hike in tariff should be imposed after 10 years as instead of five-six years.

(iv) Listening to the Complaints of Citizens

The Council is responsible to listen to the complaints of citizens regarding low water pressure, water leakages, defect in meter, bursting of pipelines, etc. For this, a complaint centre has been in operation since 1998 at Industrial Area, Phase-7, where citizens can personally register their complaints also on telephone.

As far as the citizen's views regarding the registration of complaints are concerned they complain that their problems are not solved even after so many days say 10 or 15 days. Moreover the complaints on phone are not attended properly by the staff as phone is either busy or if the complaint is attended the person on other side either do not listen to the complaint or disconnect the phone without giving appropriate reply.

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Major Findings

- A wide gap exists between demand and supply of water due to inadequate pumping of water through tubewells.
- Inadequate supply of water results into low pressure.
- The procedures for getting water connection are neither specified nor publicised. Though a checklist is provided by the division, it does not ensure clarity. It only specifies the list of documents to be attached with the application form. But it does not mention anywhere by whom and from where these certificates are to be issued.
- Lack of clarity in understanding rules, leads to confusion in the minds of consumers and whenever any document is unattached, the concerned officials scold them instead of helping them.
- The procedure for getting water connection is much more painful for the residents of villages as most of them are uneducated and ignorant about the required administrative procedures.
- The consumers have to meet a number of officials to get their application forms approved and the officials are rarely available.
- Citizens are dissatisfied with the water charges as they are too exorbitant and it has become very difficult for them to afford them.

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