

IRAN'S URBAN WATER MANAGEMENT: Need for Institutional Reforms

M. Hashemi¹, J. Attari², J. Amezaga³, P.E. O'Connell⁴

(1) PhD Student, School of Civil Engineering & Geosciences, University of Newcastle Upon Tyne, UK

(2) Senior Lecturer, Power and Water University of Technology, Tehran, Iran

(3) Senior Researcher, Institute for Research on Environment and Sustainability (IRES), University of Newcastle Upon Tyne, UK

(4) Professor, Water Resources Engineering, School of Civil Engineering & Geosciences, University of Newcastle Upon Tyne, UK

ABSTRACT

Providing a safe and reliable source of drinking water and improved sanitation for urban population are one of the main global challenges of the 21st century and part of Millennium Development Goals. Iran is trying to achieve these goals and ratified its '*Strategic Long Term Plan for Water Resources*' in 2003. Water shortage condition is not just applicable to agriculture and industry, but also for drinking. Urban water supply constitutes about 6% of the total water usage indicating that agricultural sector has the highest demand on water resources. However, the standard of living is increasing so the demand for urban water supply and sanitation. The main drivers (pressures) are population growth (annually 2.5%) and urbanisation (up to 500% increase in a decade). Although more than 98% have access to safe drinking water, only 25% of urban population have access to full sanitation. Using Saleth & Dinar's (2003) Institutional Decomposition Framework, an analysis was made. The current unbalanced situation stems from historically uncoordinated nature of urban water management. A turning point was the establishment of WSS companies in 1990. The situation has greatly improved but there is a need for greater reforms and re-orientation of the institutions in terms of policy, legislation and administration to cater for the needs of changing supply-demand and quantity-quality relationships. The pace of development can not be sustained without full cost recovery while adequate provision of services will be limited by population growth. Institutional reforms may require good economical and financing mechanisms, Capacity building and sound educational policy.

Key words: Integrated Urban Water Management (IUWM), Institutional reforms, Water Supply and sanitation (WSS), Capacity Building, Iran

1. INTRODUCTION

Iran as an arid and semi-arid country is characterised by scarce water resources and its availability is declining to a crisis level (Mahmoudian, 2006). Accordingly, water is the most important and binding constraint for any future development. Freshwater shortages are accelerating due to over-exploitations of this vital resource and lack of investment in developing water sector for different uses such as agriculture, domestic or industrial. Bahrainy (2003) asserts that Iran's "*water shortage condition is not just applicable to agriculture and industry, but also for drinking*". Water and Sanitation Services (WSS) sector in Iran has faced many challenges and the current thinking is to go towards an integrated and holistic approach in terms of management and development. Similar to world trends, government's policy promotes Integrated Urban Water Management (IUWM) as a model to be applied to WSS sector.

In many parts of the world, including Iran, population growth and urbanisation are two phenomena in which put a great deal of pressure on water and land resources. Bahrainy (2003) notes that, in the last decades, a tremendous rate of urbanisation coupled with a great deal of industrialisation have endangered the biodiversity in the country and caused environmental degradation. In addition, this has brought a higher standard of living and expansion of modern technology (Zakavat, 1997). In the developing world (and Iran), cities are engines for growth and the world trend is that by year 2020, urban dwellers will outnumber the rural population. However, in Iran, this has already occurred: 62% of Iranians live in urban area. Iran has 0.36 of the world's freshwater resources whereas about 1% of the world's population lives in Iran, (IWRMC, 2006). Water allocation has been a source of conflict

since water availability in terms of quantity and quality may not match demand of all users. Voluntary water management practices are rational but politically ineffective. In addition, water and sanitation services (WSS) are primarily political and economic in nature, (PRINWASS, 2004). Supply clean water to urban dwellers is of great importance. Improvements in the delivery services are a matter for political will and vision. Water for all is a principle adopted by UN and international agencies for development. This principle does not come cheaply and it is a matter of good economical measures and financing mechanisms.

Institutional aspects have been recognised as an important element of Integrated Urban Water Management (IUWM). Institutions are considered to be the mould of social life; consisting of systems for interaction of laws and mechanisms for monitoring and enforcing these laws. Hence, institutions provide a medium for stability in the society by channelling and regulating conflicts. An effective institution should have a proper conflict resolution mechanism. The Urban water supply and sanitation legislations are largely focused on environmental and technological dimensions that set limits and presented new technologies without taking the importance of institutional change into account, (Pahl-Wostl, 2002). In Iran, social movements and civil society partnerships may be the key to put water high on political agenda. However, as Castro (2004) argues that even by formal granting of a universal right to water and sanitation in the constitution, is “*by no means sufficient to secure access to these essential services*”. Therefore, strengthening institutional aspects by having adequate policies, laws, regulations and administrations are vital for the implementation of the integrated approach of water management. In addition, capacity building measures are required to strengthen institutions to carry out its tasks.

A brief overview of the WSS sector in Iran is included in this paper followed by an institutional analysis of the urban water sector. The needs for institutional reforms as a building capacity measure to implement IUWM will be discussed.

2. WSS SECTOR IN IRAN

Urban (and rural) water supply constitutes about 6% of the total water usage in the country. This means that the great pressure on the water resources come from the agriculture sector.

2.1. Technical and aspects

Table 1 provides a survey of Iran capacity to provide water and sanitation to its population (NWWEC, 2006). 98% of the population have access to drinking water. However, only 25% have access to full sanitation services. Most of the wastewater collected are not treated and sent to streams and rivers. The situation is serious (Mahmoudi, 2006). The main reason for this situation is the high cost of treatment so many cities are without treatment plants for economic considerations, (Behrooz, 2005)

Water Supply		Wastewater and Sanitation		unit
Total Urban Population	46.73 (62% of total population)			million people
Access to services	46.19	Access to sanitation	11.90	million people
Percentage	98.32	Percentage	25.5	Percent %
Max. Potential available Water capacity	9,129	Treatment plants capacity		MCM/year
Max. available water capacity	6,167			MCM/year
total Volume of all reservoirs	10,330	Wastewater Plants' capacity	750	MCM/year
Amount of water delivered	4,698	Collected wastewater	482	MCM/year
Water treatment plants' capacity	2,547	Treated wastewater	244	MCM/year
Number of cities with water supply services	858	No. of cities with wastewater collection lines	207	

Table 1: 2006 Survey of Iran's water supply and Sanitation Services (NWWEC(b), 2006)

A new direction for urban water management may be to look at the energy requirements for the sector. There is a need to find a relationship between water and energy: cheaper source of energy is required. Providing high quality drinking water, transferring water by pumping stations, transport of waste sludge, reuse of wastewater after treatment, all require energy and without a right balance sustainability can not be achieved. In providing 1m³ of drinking water, energy consumption takes up to 12% of the total cost (NWWEC(a), 2006). Using wastewater for agriculture for example, will increase energy consumption up to 30%.

2.2. Environmental aspects

The environmental degradation as a result of urbanisation is well documented and is beyond the scope of this paper. However, one should note that urbanisation means increased water consumptions as well as changing the hydrology of the basin and having physical, chemical and microbiological impacts on the environment. Environmental degradation is caused by extensive urban development (500% increase in the last decade). Changing land use requires special permits by a committee which excludes or gives limited role to the Department of Environment (DoE). Water companies and wastewater companies are not consulted or involved in the planning application. After the approval by the special committee, these companies are ordered to extend their services to the new part of the city. Land speculation and doggy housing corporations have had a great deal of impact on urbanisation in Iranian cities (Mahmoudi, 2006). In addition, political influences have affected decision making in land use change process. This is usually a closed-door type decision making with little transparency and no public involvement.

2.3. Socio-economic aspects

Population growth may be the determinant factor in the both adequate provision of WSS services and sustainable urban developments. In Iran, there are 3 main characteristics of the increase in population: (1) faster rate of growth in urban area, (2) enlargement of existing cities and creation of new ones and (3) immigration from rural to urban areas in search of employment. There are few ethical issues that must be clarified by policymakers. In the provision of water, ethical principles are frequently ignored. Lord Selborne (2000) has commissioned a report¹ for UNESCO on '*the ethics of freshwater use*' with the following main elements: (1) human dignity (rights), (2) stakeholder participation, (3) equity, (4) sustainability (5) good governance. The question of water rights, ownership and religious framework of equity and public interest are hot issues that require close attention.

Iranian policymakers acknowledge the importance of sustainability and the economic value of water. But it is a matter of political will to take hard decisions which might not be popular and politically sensitive. There is a need for financing and up keeping the infrastructure and so there is a bias towards delegation of management and partial privatisation (Mahmoudian, 2006). Water bills constitutes 0.02 (below recommended consumption) to 1.2% (twice the amount of recommended consumption) of the total expenditure for an urban dwellers (NWWEC(a), 2006). Water pricing were envisaged without considering the development and infrastructure costs. The attitudes of the water companies are not fully customer oriented since income from customers are negligible. Hence, there is a policy to make services more customers' oriented (Kashfi, 2007). There is some investments to build treatment plants and lay more pipelines. There were 73 wastewater treatment plants in 2003. This has increased to 90 plants by end of June 2006. International finance has been employed: \$ 761 million US Dollars have been taken from the World Bank to construct wastewater treatment plants in 8 cities in the northern and southern provinces of Iran, (Kashfi, 2007). Nevertheless, the problem is more than just building more infrastructures. There are underlying issues that need to be considered such as maintenance and proper management of the old and new infrastructures

2.4. Institutional aspects

¹ available at <http://www.unesdoc.unesco.org/images/0012/001220/122049e.pdf>

The current unbalanced situation stems from historically uncoordinated nature of WSS management. Before 1990, the WSS were provided by different organisations including Ministry of Energy, provincial governments, municipalities and even independent organisations and in some cases with no proper management. In 1990, the water and wastewater companies were established and a considerable institutional reform has taken place since. The political map of the country is divided into 30 provinces. Ministry of Energy (MoE) is the guardian of water resources management including WSS sector. There is a Deputy Minister for water and wastewater affairs who is also the managing director of National Water and Wastewater Engineering Company. There are 2 organisational levels: (1) strategic and tactical level: the National Water and Wastewater Company which provide top management and responsible for policy making; and (2) operational level (Provincial Urban Water and Wastewater Companies [42 companies in total]) responsible for the day to day real time monitoring and control. The reason for having 42 companies instead of 30 provincial companies is that some large cities such as Tehran, Shiraz and Isfahan have their own independent companies: for example Tehran has 5 companies.

3. INSTITUTIONAL ANALYSIS

A water body institution can be a mixture of several categories (Amezaga, 2005; Ivey *et al.*, 2006): (i) Policies and objectives and guidelines (operational plans and procedures). (ii) Laws (which can be formal and informal), rules, regulations and conventions. (iii) Administrative structures (organisations), their bylaws and Core values. (iv). Political structures and processes (Accountability mechanisms) (v) economic and financial arrangements e.g. incentive mechanisms. (vi). Norms, traditions, practices and customs. The methodological framework for the analysis was based on institutional decomposition and analysis framework (Saleth & Dinar, 2003). The analytical decomposition is performed at two levels. First, the water institution is decomposed into 3 main components (law-policy-administration) then each of the components is decomposed further to identify its constituent institutional aspects. In this analysis and for pragmatic reasons, an institution is decomposed into 2 main components: policies-laws and administration.

3.1. Policies-Laws

There are many documents policy documents and legislations with regard to water affairs and land use change. There are two main policy documents (1) *4th 5-year Development Plan (2004-9)* which sets 6 qualitative and 19 quantitative goals for water sector (IWRMC, 2006). It encourages: an integrated approach to management, consideration of economic aspects of water supply, sustainable development, raising finance, and strengthening public contributions. With regard to urban water and sanitation, the goal is to have an average annual growth of 6% and 16.9% respectively. (2) *Long Term Development Strategies for Iran's Water Resources* was approved by the council of Ministers in 2003 (IWRMC, 2004) with 18 articles. It refers to the management, development, consumption, quality and protection of water resources. With regard to urban water, the plan emphasises the need to: (1) improve qualitative indices and standards, (2) decentralise management and involvement of public and local organisation, (3) leakage control, (4) satisfy the basic needs for safe water (drinking) and sanitation, Guidelines for implementation of the policies are to be prepared by the end of 2007.

There are many laws and legislations including:

(1) *Article 44 of Constitution* has provided the most important path for privatization. It emphasis needs to develop public, private and cooperative sectors in a harmonised and co-ordinated fashion. Water prices are set each year in a parliamentarian act without considering full cost recovery. Hence, the WSS companies have faced massive accumulative losses and the gap is widening further. Therefore, practically, there may be no incentive for private investors to invest in companies which are losing money. Also, we should remember that delegating management tasks to private operators is not equivalent to privatization. Absence of regulatory framework for private participation is another problem. With mounting maintenance costs, there is always a talk of privatization. There are different

models for public private which are country specific: such as concession, rent etc. These have to be studied in detail to bring a realistic model for Iran.

(2) *The Fair Water Distribution Law (1982)* sets the rules for the conservation and distribution of water for different uses such as urban, industrial and agricultural uses. Notably, it does not consider allocation of water to the environment. It also neglects the economic value of water.

(3) *The Bill for the establishment of Urban Water and Wastewater Companies (1990)* was approved by parliament. As a cultural impediment, water is not valued as an important, finite and valuable resource. So in 1993, article 9 of the Bill introduced and set water prices without considering infrastructure and development costs. Hence, the accumulated annual losses for these state companies are increasing: for example from 1992 to 2006, the accumulated losses have increased from 442 billion Riyals² to 9,200 billion Riyals. In year 2005-6, Urban Water and Wastewater Companies had an income of 3,200 billion Riyals compared to a total expenditure of 5,200 billion Riyals a staggering 2000 billion Riyal deficit (NWWEC(a), 2006).

(4) *Law of Promotion of Investment in Water Projects in Iran (2003)*: a law was passed to encourage investments in water projects. This was to encourage private and foreign finance into water projects. However, due to the lack of institutional arrangement and economic incentives and the high cost of infrastructure costs, the private finance has been shortcoming and there are some 16 major urban water supply projects with inadequate financial resources (NWWEC, 2006).

(5) Recently, a new stepped or ladder tariff system was introduced. The household which uses more than specified amount of water will be penalised by having to pay higher bills. However, this system is far short of full cost recovery. Urban water bills constitute up to 1% of a household bills: a valuable resource which is very cheap. However, there has been a promotional campaign through media to educate households to use less water. Leaflets and guidelines have been produced to encourage urban dwellers to use less water.

The process of re-organisation in the WSS sector is dynamic and evolving. There is an Institutional inter-link policy stating that High Water Council (HWC) is responsible for making policy in water supply, distribution and consumptions (Ardakanian, 2005). Some experts within the Ministry of Energy believe that water resources should be given a different portfolio; and see the HWC as a strong basis for policy making. This may provide a basis for an inter-link between sectoral policies. Article 8 of the Long term Plan provides a landmark policy not just integrating water-land planning and management processes but also, those activities outside urban centres must take into account its affect on the environment and cities within a river basin. Also there are integrated policies: urban land use planning and development

3.2. Administration

There are 3 main options to re-organise Provincial Water and Wastewater companies:

(1) *Privatisation*: These companies are financially and operationally not very strong and have a demoralised staff. Even though, these are considered to be commercial entities any redundancy plans will be politically resisted. In addition, it will induce huge redundancy payments. Hence, there may be no viable basis for privatization of these companies. In addition, they are economically bankrupt and their accumulated losses are increasing year by year. However, as recognised by PRINWASS (2004), privatisation may not necessarily translate into efficiency and high performance of the WSS sector.

(2) *Decentralisation*: have been mentioned in the Long Term Plan. Currently, the managing director of the Holding company is also the deputy minister for the WSS directorate at the MoE. So the trend is to separate these two jobs so the deputy minister will deal with policy and macro-management of the sector whereas the managing director will concentrate on operational level. NWWEC is in fact a public utility. It seems that it does not wish to relinquish power and give more autonomy to the provincial companies which are semi-private units. On the other hand, there may be no viable private alternatives due to financial incapability of these companies. Nevertheless, in the 3rd and 4th 'Development Plans' good directions have been set for dividing these two. Having one Deputy Minister

²US \$1≈ 9500 Riyals.

for water might be useful in the sense that water supply and waste water re-use can be managed in one cycle.

(3) Project Management investments: there have been some successful pilots in Mashhad, Isfahan and Shiraz with regard to private and international investment in the construction of wastewater plants. However, there is lack of public investments as well as high cost of maintenance of the services after construction. Since there is no full cost recovery plans, these projects may remain isolated cases and will not be widespread in the whole country.

4. DISCUSSIONS

From the analysis, it seems that administrative institutions may be needed to adapt and respond to two main drivers for change: urbanisation and population growth. Based on Ivey *et al.* (2006) 4 elements are needed to be considered in any re-organisation process:

(1) Technical Knowledge. Lack of information is a major obstacle to an efficient water allocation strategy and water demand management, WDM. A management information system (MIS) is a prerequisite for WDM. Duplication of management activities can be eliminated by having an effective MIS. Information on location and extent of the characteristic of water resources is needed. There is a sectoral approach to management of information. These companies are young (established since 1991) and have a modern technological system and are far better than Water Authorities.

(2) Legal Authority: local governments should have the authority to influence the existing and future land uses, management and practices. In Iran, Provincial Governors are not local governments and they usually follow national policies but can act independently. Municipalities are service providers and local councillors which are chosen in an election can choose a mayor and can not influence policies and decisions with regard to land use changes. DoE is also absent from the decision making process. Therefore, the urbanisation problem can not be tackled unless clear legal authority is established so that all environmental and resources consideration are taken up in the decision making process.

(3) Public involvement: awareness campaigns and consultation and tradeoffs between local economic developments and public health and the environment are required. As noted by McCulloch (2006) participation is not as far as decision making but rather focusing on asking people what they are concerned about. Cowei *et al.* (2005) suggest a 'continuum of authority' with 4 nodes starting from (i) notification: inform public, (ii) advisory: gather information and set performances, (iii) Consultative: identify issues and generate alternatives and (iv) decision making. At the moment public at large are not informed about decisions. Institutions must be able to serve as mechanisms to resolve conflicts. Since this is absent from an urban administration set up, Governors can have a bigger influence. It is odd that greater powers to provincial governors are considered as a decentralising measure, when in actual fact local stakeholders are sidelined such as municipality councillors. Also, customers (water users) should have a say in the decision making. At present, customers have little impact on the provision of existing and new services.

(4) Land and water integration: as noted by Amezaga (2005) the land-water link is explicit in the definition of Integrated Water Resources Management (IWRM) of which urban water management is a constituent. Land and water integration implies the determination of negative-positive (Cost-benefit) across a broad range of stakeholders both public and private. Clearly, there is a sectoral approach to land and water administration and therefore, this can only be facilitated by administrative reforms and stakeholder participations. Present institutional linkages need to be changed so as to conform to the needs of inter-sectoral water and land management. Harmonisation of administrative set up could be an answer.

As far as Institutional Reforms are concerned, the following issues should be given especial attention: **(1) Need for an integrated approach for UWM:** moving from sectoral approach to holistic, from only technical concepts to incorporating environmental, social-economical and institutional aspects into account.

(2) Institutional reforms are inherently a slow process. Policy and law making is primarily the result of piecemeal and reactive decisions taken over time.

(3) *Institutional Reforms are country specific* can not be directly copied. Models and experience of other countries should be carefully reviewed. Local culture and laws should be given special attention. We can even start with some small pilot projects.

(4) *Enforcement of laws* as in compliance is a problem. Good laws and regulations exist in Iran and they should be put more into action.

(5) *Decentralization /Management Delegation*: There is a question of power relations in the institutional set up in Iran. Unlike most developing world, the Water and sanitation service providers in Iran are not the municipalities (local governments). State companies which are part of Ministry of Energy are responsible for provision of WSS. Therefore sub-sovereign guarantee mechanisms may be required to enable them to have access to international financial markets. Governance and institutions have a large effect on expected productivity returns to investment. Small decentralised wastewater systems may be considered rather than centralised and highly expensive systems. WSS sector is in a way more advance than the water resources sector as far as management delegation towards private sector is concerned.

(6) *Need for Financial Back up* for sustainability of services. Haarmeyer and Mody (1997) noted that in the developing world, water and sanitation sector paradoxically “is generally financially and operationally weak”. Without institutional strengthening such as creditworthy local governments, independent regulatory agencies and far fetched local capital markets, private capital cannot be attracted in the sector.

(7) *More participation of stakeholders /NGOs* in decision making and monitoring services. However an effective and efficient response to inadequate water resources management lies in the re-evaluation of current management practices so that all stakeholders (governmental and non-governmental organisations (NGOs), hydrologists, civil engineers, water planners and managers, general public and cross sectoral alliances and civil society groups) interact to achieve water for all strategy.

(8) *Services provided should move towards customer oriented services*. In addition the pace of development can not be sustained without full cost recovery. Customer oriented services are desired.

(9) *Capacity Building measures*: Administrative system needs to be strengthened by Capacity Building: training of personnel (human resources development), public awareness campaigns and educational policy might be necessary for both economic growth and development.

5. CONCLUSIONS

In this paper, an initial institutional analysis was made and some important issues for the WSS sector have been highlighted. In order to explore these issues, detailed research studies and pilot projects are required. Spatial, seasonal and climatic variability of water resources may be the main themes of any such studies. Population growth and urbanisation are serious challenges, too. The financial and institutional aspects should be strengthened. There has been a tremendous improvement in the WSS services. The pace of institutional reform process has been slow but there has been a radical change in perceptions and awareness among stakeholders. Capacity building measures may be a key element to enable reform and change. A balanced solution may be a function of many variables including cultural dimension, public health issues, financial and institutional interlinks.

Acknowledgements: this is part of an on-going PhD research at the School of Civil Engineering and Geosciences, University of Newcastle Upon Tyne, UK. With special thanks to Eng. Kashfi, NWWEC Coordinator of World Bank projects in Iran for giving an interview. Information and statistical data were provided NWWEC and IWRMC.

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