

WATER POLICY AND URBANIZATION IN MOROCCO: THE RECENT CHANGES IN THE URBAN WATER SPACE IN A COUNTRY IN SOUTH MEDITERRANEAN

El Mahdad El Hassane, Ouhajou Lakbir
Ibn Zuhr University, Agadir, Morocco, elmahd@hotmail.com

Abstract

Originally, like the rest of the Mediterranean countries, water has played a factor in the emergence of the urban landscape of Morocco. Virtually, all ancient cities were equipped with traditional urban water systems. Since the advent of colonization at the beginning of the last century, urban growth had taken an unprecedented pace therefore imposing serious challenges in the water supply of these cities. To meet the growing need for urban water, urban management was forced to review and adjust continuously the policies and strategies for drinking water supply in urban networks). In this presentation, we discuss characterize of the drinking water system supply in Moroccan cities, and by treating its internal structure and its management patterns, its operation, and the recent changes it has undergone.

Keywords: urbanization, water potential, water policy, water management, Morocco.

1 INTRODUCTION

Like the rest of the Mediterranean space, city life has developed in Morocco in synergy with the existing water potentials. To ensure their water supply, old cities were built mainly on river banks and around water springs. When water availability becomes insufficient, some amendments and minute management systems were carefully implemented. Virtually all the traditional techniques of storage, extraction or diversion of water were used. With the advent of the Franco-Spanish colonization a new political, economic and social order had been imposed leading to an unprecedented outbreak of the urban phenomenon. The urban landscape has witnessed some deep changes: more and more important weight of the urban population, an increased number of urban centers, extension and diversification of urbanization especially in coastal areas ... To meet the growing need for urban water and the backlog, the government embarked on an endless mobilization for urban drinking water. In this relentless pursuit of resources, revisions and adjustments to water policy were inevitable. This study is a follow-up trial of Morocco's experience as a Mediterranean country with a limited water potential, but which has experienced rapid urbanization. The focus will be on urban water Moroccan network and the evolution of its structure, and the major changes to its operation. The results presented were developed as part of collective researchers with the support of institutions acting in the management of the water sector in this country.

2 METHODOLOGY AND WORK TOOLS

Given the importance of national territory and the large number of actors in the urban water sector, this work is based on an analysis of existing documents and the various databases regularly produced by organisms in direct or indirect relationship with the subject. The main sources are:

- The rich literature on water resources in Morocco consists mainly of theses and unpublished reports, and especially of articles or books published regularly by the water services in the country;
- The various publications of the "Haut Commissariat au Plan" consist of results of general censuses of population and habitat and analysis of various demographic and socio-economic databases set up by the national organization;
- A capital interest is given to the retrieval of data and documents of the "National Office of Drinking Water," state agency responsible since 1972 for the production of drinking water and its distribution in a large number of urban communities.

In addition to collecting and analyzing statistical data and literature developed since the sixties, the methodology adopted here has focused on the organization of a series of individual interviews or focus group to discuss and share the research results provided by the different actors in the sector.

3 RESULTS AND DISCUSSION

3.1 Urbanisation, water needs and potential water

3.1.1 Characterization of Moroccan urbanization

Originally, the localities that make up the Moroccan urban system were limited, small, and mostly located on the interior of the country. Generally, the urbanization rate was maintained at about one tenth of the total national population. The advent of the Franco-Spanish colonization in Morocco in the early 20th century triggered off a process of dramatic development of the urban phenomenon. The political, economic, social and cultural outbreak continued even after independence leading to a rather complex urban landscape. Urbanization in Morocco is essentially demographic. Currently estimated at over 19 million people, Morocco's urban population was only 3.3 million inhabitants in 1960 (CERED., 2007). The projections say that we will go beyond 26 million urban residents in 2024 and 32.5 million by 2060. This growth was accompanied by a striking imbalance with the rural environment. At the turn of the 21st century, the urbanization rate has reached 50% in 1992, when it was only 29 % in 1960. Currently, this rate is estimated at 59 % to 62 % in 2020 and 64 % in 2030.

The development of the urban phenomenon manifested by the increasing number of cities. The number of current urban localities is 352. It was only 112 places in 1960. These are cities smaller than 20,000 inhabitants that constitute more than 2/3 of all urban centres, but they contain only a tenth of the total national urban population. The majority of urban dwellers, more than two thirds of the total, is settled in large cities of 100,000 inhabitants or more. The Grand Casablanca, with over 3 million residents, Rabat-Sale with over 1.7 million and Fez with a population of 1 million, include around 1/3 of the total urban population across the country.

Table 1. Demographic weight of cities by size in 2004		
City size (population)	Number of cities	Demographic weight (%)
100 000 and more	26	66,7
50 000 à 100 000	28	11,8
20 000 à 50 000	60	11,3
less than 20,000	238	10,3
Total	352	100,0
Data Sources: Haut Commissariat au Plan, Direction, Rabat.		

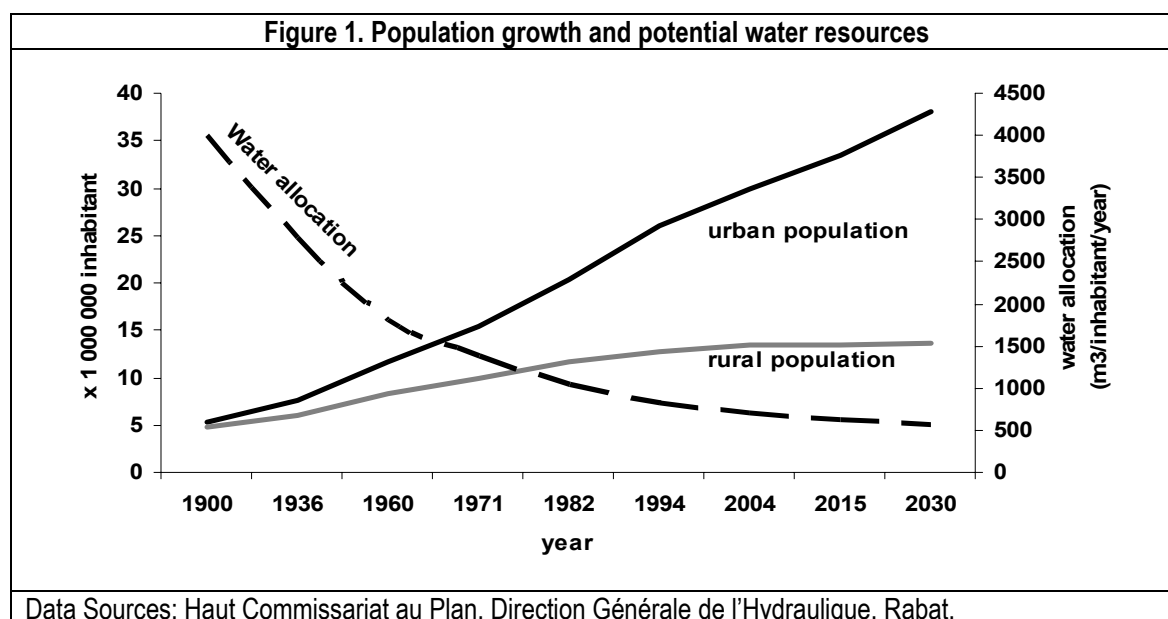
Spatially, the urban growth in question has shifted the center of gravity of the urban system from the interior to the Atlantic and Mediterranean coasts. Indeed, urbanization has given impetus in the process of coastal development in the country. Currently, one in two of the total urban population lives in 26 cities along the coast. Of these, four real cities have been erected or in process: The Greater El Jadida, Kenitra (including the Grand Casablanca and Rabat-Sale); the center of Agadir Souss low lands; the center of Tangier-Tetouan and Nador, Al Hoceima. In addition, coastal urbanization has not spared the arid and semi-arid areas. In Saharan areas, new towns have emerged and the old centres have seen their population reach unprecedented levels. The case of urban centres of Laayoune-El Marsa with 200,000 inhabitants and that of Guelmim with 100,000 inhabitants occupy quite advanced positions in the urban landscape of Morocco, are respectively the 12th and 25th place. The total area urbanized nationally is estimated at more than 1,500 km². Much is usually reserved for housing. But industry, tourism, services and other urban activities also occupy relatively large areas in major cities.

3.1.2 Mismatch between urban need and the water potential

The attested Moroccan urban profile displays an imbalance between the growing need for drinkable water and the available water potential. The overall assessment of needs and resources is unbalanced. The network development in urban areas without conventional water resources expresses this imbalance.

In the context of South Mediterranean and the Maghreb, Morocco is considered a country with relatively large water resources. However, population growth, chiefly that of urban populations, has contributed to a continued reduction in the overall individual shares and the rate of mobilization of existing resources. Plenty Abundance is a memory. Morocco is currently in the process of joining the category of countries in short supply. On the basis of a potential of 21 billion m³ usable (including 2/3 consisting of

renewable surface water), the current allocation is 700 m³/capita/year about when it was in the range of 1,800 in 1960. Predictions are that a lot of 570 would be reached in 2025.



In addition to the weakness of its volume, the water potential suffers from an articulate annual and interannual variability of inputs, and spatial disparities. Rif basins (Loukous, Tangiers and the Mediterranean coasts) hold more than 1/5th of water resources as they cover only 3 % of the national land area, an overall allocation of water in excess of 1900 m³ / capita / year. For against the Saharan basins, covering over 40% of the equipped area only 0.2 % of water potential, an endowment of water only 140 m³/capita/year. This unequal distribution is coupled with a mismatch between areas of high human presence and concentration of those water resources. For small basins and coastal Atlantic Bouregreg-Chaouia is quite significant: they house the country's rich urban centers but have only less than 5% of water resources.

In their action, the water supply management is not only called upon to render the water quantity proportional to the growing demand for various urban activities. It must both increase the supply system to cover the large number of urban centers, and implement systems increasingly stretched to meet spectacular demand. The premature saturation of local water resources imposed the use of inter-basin transfers.

Table2. Spatial disparity mobilized by water potential watershed in Morocco in 2004		
Basins	Overall allocation of water	
	m ³ /capita/year	inhabitants / hm ³ /year
Rif, Tangerois, Loukous	1910	523
Moulouya	1026	975
Sebou	916	1091
Bouregreg, Chaouia	158	6328
Oum Rbiâ	915	1093
Tensift, Haut Atlas atlantique	456	2193
Souss-Massa	249	4011
Guir, Ziz, Drâa	594	1684
Bassins sahariens	142	7067
Total Maroc	708	1413

Data Sources: Haut Commissariat au Plan, Direction Générale de l'Hydraulique, Rabat.

3.2 A management system in continuous metamorphosis

After independence, the country inherited a difficult situation. Only a limited number of urban and affluent areas enjoyed some running water. To quench the thirst of unbridled urban centers, the revision of national water policy was necessary. Thus "the National Office of Drinking Water" (ONEP) was created in 1972. This new organization has come to replace the "board of Industrial Operations" and to implement the

recommendations of the first "National Master Plan of Water Supply." The action of ONEP is strictly devoted to drinking water in the country with specific missions: (i) the planning of drinking water by the assessment of the application and reservation of water resources (ii) coordinating the process of implementing projects of drinking water, (iii) monitoring and quality control of supply resources, (iv) and the provision of service management and distribution of drinking water to local communities.

This government-owned industrial and commercial company with financial autonomy, has acquired a rather rich experience. It has perfected a recognized expertise at all levels: technological expertise, mobilizing, funding, assembling large projects, development of partnerships with national and international integration of the beneficiaries in the projects...

Table3. Development of main indicators of drinking water sector						
Indicateurs	1955	1965	1975	1985	1995	2005
Production capacity in m ³ /s	4,5	7	11	35	45	52,5
Drinking water production in million m ³ / year	80	160	350	600	740	890
Processing Stations (unit)	3	5	10	27	46	53
Linear production lines (km)	500	770	1140	2530	3590	6030
Rate of drinking water (in %)	58	69	83	97	100	100
Average producer price (MAD courant/m ³)	-	-	0,4	1	2,81	3,7
Gross grant (liters / capita / day)	122	157	126	144	131	98
Data Sources: Belamari F. 2007						

To support the process of improving service quality of drinking water, accompanying measures have been implemented: the adoption of a progressive tariff system for the fight against waste and support social connections ; granting the status of financial autonomy to ONEP and the use of donor funds for the completion of large projects, the enactment of the Water Act, the use of delegation of water service distribution and sewage to the private sector in major cities ... Monitoring the evolution of sector indicators of urban drinking water illustrates the progress of the improvements.

As soon as the generalization of running water in urban areas began to bear fruit, various difficulties and side effects began to emerge. From 2002, to mark the holding of the ninth session of the "Superior Council for Water and Climate," a new policy has been adopted. This is a switch from supply management to demand management of water service in an integrated and sustainable manner. The concretization of this new direction is: assigning sewage services and management of drinking water in rural areas to ONEP, and the pursuit of delegation of drinking water and sanitation private organizations in major cities.

3.3 From local resource mobilization to the large urban water

After defining the country's water potential, the French colonial authority has directed the water policy in Morocco towards the mobilization of available resources to serve primarily speculative agriculture. After independence, this trend would be confirmed by the adoption of the strategy of building large dams to irrigate one million hectares by the year of 2000.

In this policy, limited interest has been given to drinking water and industrial urban water use, while the needs of urban areas have entered a phase of accelerated growth. The frequency of drought and the continuous expansion of urban and under-equipped suburban neighbourhoods, over time would reveal the extent of the lack of infrastructure and especially the profound deficiency in access to water. To ensure an adequate urban water service and able to improve the level of the HDI, the country entered a process of development of increasing complexity.

The rapid saturation of local water resources has prompted developers to switch their action to the installation of system supply drinking water adapted to regional dimensions of a higher financial cost. Thus, Morocco enters the era of large urban water, every urban center has developed a hydraulic radiation proportional to its size and volume of its water needs. In addition to the famous system of water supply of Greater Atlantic Kenitra-El Jadida making use of water transfers of three major watersheds, other larger systems have been created or are in progress in different regions, from north to south: Guelmim-Tantan The large Agadir, Marrakesh, Tadla-Plateau des Phosphates, Fez, Meknes, the Peninsula Tingitana, Nador, Al Hoceima ... In the near future, the spread of urbanized areas will eventually connect these different systems and higher volumes of drinking water will have to be canalized.

These urban water systems are a success in terms of generalization and sustainability of access to potable water service. But their implementation, as well as their maintenance requires financial sacrifices in a

context of limited resources. On the other hand, the operation of these systems can not be completed without competing with the agricultural sector which constitutes a fundamental basis for the national economy.

3.4 The impelled recourse to unconventional water

Morocco was long ranked among the category of Mediterranean countries with a relatively large potential of renewable water. But soon, under the effects of population pressure and enlargement of the economic base, it confronts a rather small margin of mobilization of water resources. The development of unconventional resources became inevitable despite the absence of local energy sources at low prices.

The wastewater reuse is not new. At the downstream discharges of raw sewage from cities with sewerage network a spontaneous irrigation has developed. Based on a volume of potable water 900 million m³ produced by ONEP in 2010, the total flow of wastewater is currently estimated at 600 million m³. After trying to use wastewater with the objectives of fighting against pollution and reusing treated water, almost all major cities have a water purifying system. This sector is generally managed by local authorities or delegated to the private sector or ONEP. The latter is currently active in 79 cities and towns supplied with drinking water, with a capacity for support of around 160,000 m³/day of wastewater.

To address spatial disparities of water resources and meet the needs of economic and social development at the basin deficit, Desalination has become inevitable. Desalination processes began operating tentatively in the Saharan provinces since the seventies. After the phases of testing and optimization, production capacity was 35.000 m³/day in 2010. Projects of desalination plants of larger size are provided in more humid areas. The procedures for setting up a station in Agadir are already underway for a production of 100.000 m³/day in the first phase. The current environment does not facilitate the use of atomic energy, development of alternative and renewable solar and wind energy may open a promising era for this country.

4. CONCLUSION

Morocco's journey in urban water management is considered among the richest experiences across the Mediterranean. It has successfully passed the difficult period in the early years of independence, just as it was postponed by several years the painful passage to the mobilization of non-conventional water. Today, in a global context characterized by a fairly complex financial crisis, the higher import bill of oil and the arrival at a fairly high rate of mobilization, a revision of the national strategy for drinking water is required. The possible further work to follow is to fight against waste in the various sectors, reinforcing the values of solidarity and application of the reality of raising prices without infringing on the social dimension of water, review the supply of some urban users who do not require high standards for drinking water, desalination along with the development of renewable energy, and of course further development of applied research and development in the field of international cooperation and exchange of Experimental results of the Mediterranean countries.

REFERENCES

- Ajbilou A. 2005 : Démographie marocaine : tendances passées et perspectives d'avenir. In « Cinquantenaire de l'Indépendance du Royaume du Maroc », Rapport thématique, Haut Commissariat Au Plan, Centre des Etudes et des Recherches Démographiques, 94ps;
- Belamari F. 2008 : Gestion de l'eau au Maroc dans un système complexe et incertain. Expo Zaragoza, Semana temática: Agua y ciudad, Eje temático: Pautas de los gobiernos locales para la sostenibilidad, 12 ps;
- Centre D'études et de Recherches Démographiques (CERED), 2007 : Projections de la population du Maroc par milieu de résidence 2005-2030. HAUT-COMMISSARIAT AU PLAN, Décembre 2007, Rabat, 39 ps,
- Direction de l'aménagement du Territoire, 2006 : Le schéma national d'aménagement du territoire, bilan-diagnostic et actualisation des données. Ministère de l'Aménagement du Territoire, de l'Eau et de l'Environnement, Rabat, 580 ps;
- Escallier R. (1984) : Citadins et espace urbain au Maroc. URBAMA. CNRS Tours, Fascicule de Recherches n° 8 et 9, 407 ps;
- Hajji A. 2006 : Présentation du secteur de l'eau potable : Bilan
- Troin J-F., 2002 : Maroc. : Régions, pays, territoires. Ed. Maisonneuve & Larose, 502 ps.