

## **Alexandria IUWM plan: Between reality and illusion**

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Within the framework of SWITCH, CEDARE is conducting a group of strategy studies that aim to develop an integrated urban water management (IUWM) plan for the city of Alexandria for the year 2037. CEDARE took the initiative of introducing the IUWM concept to SWITCH and Alexandria.

Alexandria is Egypt's second largest city, it has its own future challenges as a major city like many highly populated cities in the world, in addition to some peculiar challenges that are attributed to the fact that it lies in a region with limited natural water resources. Also, Alexandria is not totally safe from the negative impacts of climate change which is a major global concern.

Alexandria is one of the oldest cities of the world, the first ever city in history to be named after Alexander the great. It has a great history, was always characterized by its wide cultural diversity as it was continuously inhabited by many ethnic groups, however, this ethnic variability has recently decreased due to the changing economic situation.

The governorate of Alexandria extends all along a coastal line of about 70 km. It covers a total area of about 2818.8 km<sup>2</sup>, divided into six administrative districts. In the city of Alexandria there are 9 low-income, peri-urban areas that remain underserved with water and sanitation services. These areas accommodate as much as 1.4 million inhabitants, representing 41.8% of the governorate total population. Such informality could limit the chances of residents in obtaining basic infrastructure and services.

Integrated Water Resources Management (IWRM) is the systematic cross- sectoral process for the sustainable development of water resources to maximize the social, economic and environmental benefits from its efficient use. Operationally, IWRM approaches involve applying knowledge from various disciplines as well as the insights from diverse stakeholders to devise and implement efficient, equitable and sustainable solutions to water and development problems. As such, IWRM is a comprehensive, participatory planning and implementation tool for managing and developing water resources in a way that balances social and economic needs, and that ensures the protection of ecosystems for future generations. Water's many different uses—for agriculture, for healthy ecosystems, for people and livelihoods—

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demands coordinated action. An IWRM approach is an open, flexible process, bringing together decision-makers across the various sectors that impact water resources, and bringing all stakeholders to the table to set policy and make sound, balanced decisions in response to specific water challenges faced.

It is generally accepted that IWRM should be applied at catchment level, recognising the catchment or watershed as the basic hydrological unit of analysis and management. At implementation level, there has been a growing conviction that integrated urban water management (IUWM) could be pursued as a vital component of IWRM within the specific problematic context of urban areas.

Cities are dominant features in the catchments where they occur, and successes in IUWM will make important contributions to the theory and practice of integrated IWRM in the broader basin context. Thus, IUWM is not seen as a goal in itself, rather a practical means to facilitate one important sub-system of the hydrological basin.

IUWM is a relatively new research field that was introduced in the year 2000 with a longterm view of ensuring that greater planning and integration would occur in the management of urban water. The field focuses on technical aspects of the management of water supply and distribution systems, management of urban runoff and water conservation and demand management. Currently, many of these and related aspects are still being addressed by other research fields.

The IUWM field focuses on the management of technical aspects of water services. This is a new field that has emerged as a direct result of conclusions drawn by international and local agencies that sanitation, waste disposal, urban storm water and runoff, water reticulation, etc. cannot be considered to be standalone issues as they have in the past.

In the IUWM approach consideration is given to the collective impact of all possible water-related urban processes. Individual processes are then planned and managed in a way that the collective impact, with due consideration of the interaction among processes, is optimized as far as possible.

IUWM requires involvement by stakeholders such as those responsible for water supply and sanitation services, storm water and solid waste management, regulating authorities, householders, industrialists, labor unions, environmentalists, downstream users, and recreation groups. While local authorities should be well placed to initiate and oversee IWRM/IUWM programmes, planning and implementation should be driven by a combination of regulatory responsibility and user needs/obligations. Top-heavy governmental approaches are to be discouraged because they become bureaucratic and unresponsive to the concerns of water users.

Under the hypothesis that a city that is managed based on IUWM will be more sustainable and citizens will be exposed to smaller water related risks, and within the framework of SWITCH project, IUWM had to be introduced to Alexandria. CEDARE is taking the lead among SWITCH partners to develop an IUWM future plan for the city. The success story can then be transmitted to other SWITCH and non-SWITCH cities. The most important question that needs to be answered is whether the plan would be really relevant for the city in terms of future needs and current and future challenges. Thus, there are many studies to be considered before

proceeding with the plan. A sound IUWM plan takes all current and potential stakeholders into account; therefore a social analysis study could be safely regarded as an essential prerequisite for the IUWM plan. CEDARE has performed a social inclusion study in one of the nine informal settlements. Also, the plan will not be ultimately realistic if it is not preceded by an institutional mapping analysis, such analysis is important in realizing different decision makers in the water sector, both locally and nationally. Furthermore, proper institutional mapping will indicate the feasibility of implementing many particular actions within the plan. A detailed description of the main water related challenges in Alexandria will then follow.

Strategy studies are currently in progress to assess the potential of each resource separately. The different topics that are addressed by the specialized strategy studies are groundwater management, wastewater management and reuse, storm water management, desalination, water demand management, institutional mapping, financial sustainability, social inclusion and modeling the whole urban water system of Alexandria using a mathematical model. The IUWM plan will depend largely on the output of specialized strategy studies. Moreover, a strategic planning team has been formed to monitor the progress of the specialized studies and formulate the IUWM plan that should go in line with the 2017 National Water Resources Plan and 2037 Alexandria master plan for water supply and sanitation. The strategy studies will consider three case scenarios; a best case scenario, a worst case scenario, and business as usual. Those scenarios were previously agreed on during a visioning workshop that was organized by CEDARE in 2007. Many of the individual strategy studies should produce management plans of their own that would definitely help the strategic planning team in addressing all aspects of the anticipated plan. For example, the groundwater management study will assess the groundwater potential in Alexandria; clearly differentiate between renewable and non-renewable ground water, and accordingly selecting the sectors that would benefit the most from it. The waste water management and reuse study addresses the potential of waste water reuse as an additional water resource and the possibility of using that resource in the irrigation of green areas and recreational parks, as well as using it in agriculture through directing the treated wastewater to the new agricultural lands on Egypt's northern coast. The water demand management study shall produce complete water saving program and a decision support system that could enhance decision making when different future scenarios are proposed.

The strategy studies will enhance and formulate most of the IUWM plan; the results of these studies will draw the borderline between reality and illusion. Updated strategy studies results will be shown in this paper, along with their expected reflection and impact on the IUWM plan.

