

## Towards Sustainable Cities

### Integrate water resources protection in urban planning

- Protect vulnerable surface and groundwater resources.
- Invest in stormwater and urban drainage systems.
- Enforce regulatory frameworks and permit procedures.
- Expand green spaces through urban parks and urban agriculture to reduce the risk of floods and support groundwater recharge.



### Improve operational efficiency of water utilities

- Reduce unaccounted for water losses in supply networks.
- Increase reliability of water supply through increased investment and capacity-building.
- Improve wastewater management and treatment from municipal and industrial sources prior to discharge.



### Demand-side water management

- Encourage industrial and domestic users to conserve water, reduce waste and reuse grey water.
- Support investments in public water utilities so as to reduce dependency on more expensive private water suppliers.



### Monitoring Water Supply and Sanitation in the Arab Region

The Arab Ministerial Water Council considers water security, the integrated management of water resources and the delivery of water services among its key priorities. In June 2009, it adopted a resolution mandating ESCWA to lead the establishment of a regional mechanism for identifying and monitoring the Millennium Development Goal targets on water supply and sanitation, as well as to develop a set of regional-specific indicators for monitoring the quality of water supply and sanitation services in the Arab region. These efforts were recognized during the second Arab Economic, Social and Development Summit in January 2011, in the League of Arab States follow up report on implementing the Arab Summit resolutions. ESCWA is collaborating with regional partners on the launching of this regional initiative.

*ESCWA is collaborating with regional partners on the launching of this regional initiative: ACWUA, the Arab Water Council (AWC), the Center for Environment and Development for the Arab Region and Europe (CEDARE), and the Arab Network for Environment and Development (RAED)*

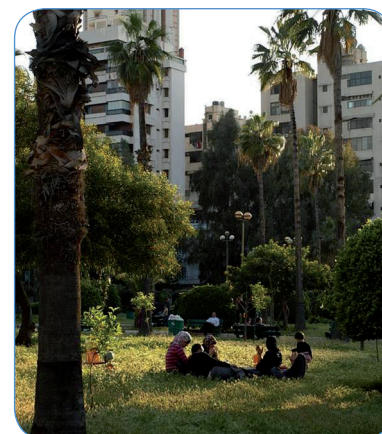
## WATER SAFETY PROTECTION PLAN FOR THE JEITA SPRING

The recent wave of urbanization in the Nahr El Kalb catchment area has put enormous pressures on the vulnerable groundwater resources, especially the Jeita Spring which provides 80 per cent of the water supplied to Beirut. The spring is threatened by pollution from untreated wastewater stemming from municipal and industrial sources. Together with the Government of Lebanon, the German Federal Institute for Geosciences and Natural Resources (BGR) launched a project intended to detect possible sources of pollution and suggest measures for a long-term sustainable protection of the spring. It includes developing a land use plan through delineating groundwater protection zones based on vulnerability maps, as well as facilitating the decision-making processes related to planned wastewater collection and treatment projects in the area. A groundwater monitoring system is also planned in order to control water treatment and improve water quality in the pipe network.



## URBAN WATER MANAGEMENT AND GREEN SPACES

The expansion of green spaces in cities through sustainable urban design includes allocating space for public parks and urban agriculture projects that can generate economic, social and environmental benefits for urban centres. These planned urban areas can improve the quality of life in cities, generate income and employment opportunities, improve local access to foodstuff while also protect water resources. Green spaces reduce the effects of extreme rainfall events by collecting storm water, preventing floods and reducing surface erosion. Opportunities for touristic and recreational activities can also be created in green public spaces.



## WATER FOR CITIES: Responding to the Urban Challenge in the ESCWA Region



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The Arab World is undergoing the largest wave of urban growth in its history marked by the rapid expansion of cities and the creation of new urban centres. This is placing increasing pressure on scarce water resources as well as water supply and sanitation networks.

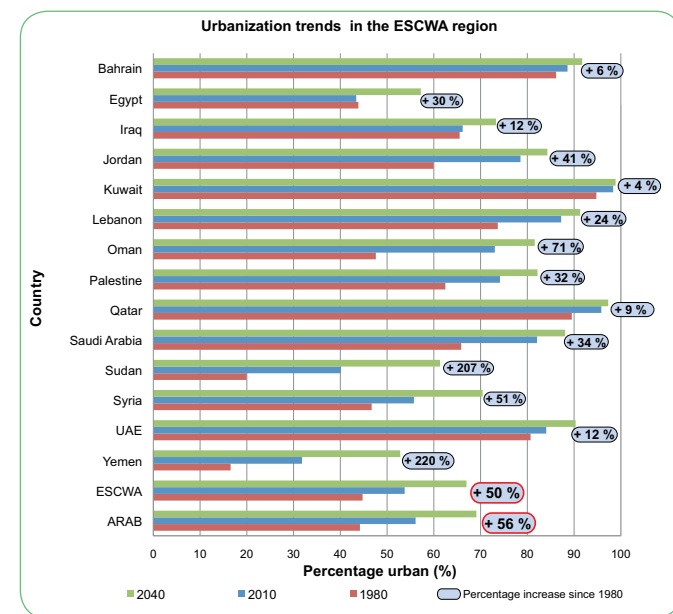
**Water resource challenges** facing cities in the ESCWA region are caused by increasing freshwater scarcity, growing demand, unsustainable consumption patterns and urban water pollution. The urbanization of watersheds has resulted in the greater frequency and severity of floods, channel erosion, loss of groundwater recharge and destruction of aquatic habitats.

**Water supply challenges** in the ESCWA region are due to water scarcity and the need for increased investment in water supply and sanitation infrastructure. The situation has resulted in limited access to regular water supply services in parts of the Mashreq and dependency on desalination for urban water supply in most cities in the Arabian Gulf and in cities situated far from freshwater resources.



## GROWING ARAB CITIES

- Today, more than half of the population in the ESCWA region lives in cities.
- By 2040, the urban population will have increased by 50 per cent in comparison to the year 1980.



Source: ESCWA, "The Demographic Profile of the Arab Countries", 2010.



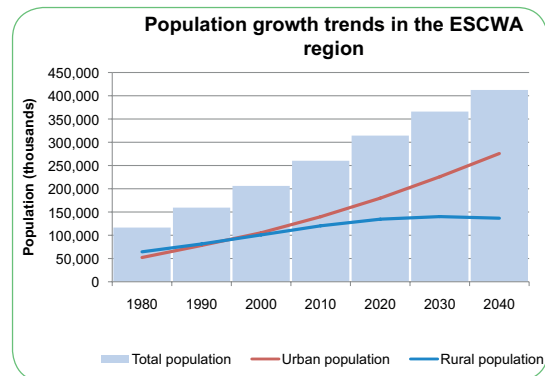
*The megacity of Cairo is the largest city in the ESCWA region with more than 12 million inhabitants. Egypt has invested heavily in new water supply and wastewater networks to encourage urban decentralization to satellite cities around Cairo.*

## WATER AND URBANIZATION

*With an annual average urban growth rate of 2.45 per cent, the urban population in the ESCWA region is growing at twice the rate of the rural population. Most urbanization is concentrated along the coast.*

➤ Urban expansion is due to demographic growth, rural-to-urban migration, the creation of new settlements due to real estate and tourism development and the need to house persons displaced by regional conflicts.

➤ Despite growing urban demand, agriculture remains the major consumer of water in the ESCWA region representing 87 per cent of water use in 2007.



## WATER AND URBAN CHALLENGES

### Water Quality Deterioration due to Improper Wastewater Management

Cities generate large quantities of waste that end up polluting surface and groundwater resources. Water quality is affected by sewage, salts, oils, metals and hazardous substances.

- In many Arab cities, municipal sewage is left untreated in open cesspits, only chlorinated, or directly discharged into nearby waterways. Industrial wastewater is often released into rivers or municipal networks that are not equipped to remove chemicals or metals.
- The unregulated disposal of wastewater degrades water resources and coastal ecosystems and can contaminate urban water supplies leading to significant health effects.

### The Sana'a Water Supply Challenge



Source: UN Photo

Located in the central highlands of Yemen, the population of Sana'a exceeds 2 million and is experiencing the highest rate of urban growth in the ESCWA region. The Tawilah Aquifer that serves this capital city extends over 3000 km<sup>2</sup>, but is being mined at a rate of 4 to 5 times above its natural recharge rate with most of the water being used for agriculture despite the growing need for water in Sana'a. The elevation of the city (2,250 m) and its distance from the sea (130 km), along with the country's limited oil reserves, discourage investment in desalination as a possible alternative source of water. With only 54 per cent of the urban residents in Yemen having access to piped water to their household and urban poverty increasing, the situation for the residents of Sana'a is expected to worsen unless a sustainable solution is found soon.

### Cost of Unaccounted for Water & Intermittent Water Supply

- Water is lost from urban water supply networks due to leaky pipes and poor maintenance of physical assets, which is often caused by insufficient institutional, human and financial capacity in public water utilities.
- Unaccounted for water reduces the availability of water for households and results in less income for water utilities, which further reduces their ability to invest in the improved delivery of water services.
- Intermittent water supply is experienced in several ESCWA countries, including Jordan, Lebanon, Palestine and Yemen, where cities often receive water only on a rotating basis. It is attributable to management constraints, water scarcity, insufficient access to energy for pumping water through networks, low water pressure, as well as conflict and instability – all of which reduce the reliability and regularity of water supply and sanitation services to urban centres.
- Sewage infiltration into cracked water supply networks occurs regularly due to intermittent water supply and low-pressure in the network, which reduces water quality and the quantity available for drinking.



**ACWUA**  
The Arab Countries Water Utilities Association (ACWUA) works to strengthen the capacity of water utilities in the Arab region through the dissemination of best practices, exchange of lessons learned and conduct workshops for improving the delivery of water supply and sanitation services. For more information see: [www.acwua.org](http://www.acwua.org).

### Poor Urban Planning & Natural Disasters

- As green spaces are replaced with buildings and impervious surfaces, rainwater infiltration is reduced thus diminishing natural groundwater recharge.
- Due to the lowered infiltration, storm and surface runoff collect pollution and debris as it flows through the city and increase the risk of flooding and damage to property.
- Extreme weather events are increasingly being experienced in the ESCWA region due to climate change; inadequate storm water drainage systems and water collection points are thus increasing the vulnerability of traditionally dry Arab cities to floods, while storm events also erode coastlines and affect coastal aquifers.

### Learning from the Jeddah floods of 2009 and 2011

In November 2009, torrential rains and flash floods hit Jeddah when 90 mm - twice the average annual total rainfall - fell in four hours overwhelming the city's storm drainage system. A similar extreme rainfall event occurred in January 2011. The floods that swept through the Saudi city's busy highways and informally built areas in 2009 killed over 150 people and damaged over 7000 homes and vehicles. The lack of appropriate water infrastructure to handle such extreme weather events exposed the vulnerability of cities in the normally arid Gulf region to the risk of flooding. Similar extreme weather events have been experienced in Oman and Yemen and have prompted efforts to improve planning and preparedness to reduce the impact of floods, landslides and rock falls in urban areas.