

2002

Abu Dhabi Water Resources Statistics

MISSION & GOALS IN WATER RESOURCES MANAGEMENT

The Environmental Research and Wildlife Development Agency (ERWDA) mission is to assist the Abu Dhabi Government in the conservation and management of the Emirate's natural environment, resources, wildlife and biological diversity. This is to be done through scientific research, proactive planning and coordination, environmental awareness promotion, policy formulation and enforcement that balances sustainable economic development with protection of the environment for this and future generations.

According to Mike Brook, Manager of ERWDA's Water Resources Programme, ERWDA's strategic goal in Water Resources Management is to develop and implement a plan to help "manage the overall water resources of the Emirate of Abu Dhabi in a sustainable, economically viable and environmentally sound way that will allow the long-term socio-economic development of the Emirate of Abu Dhabi".

INTRODUCTION

Abu Dhabi Emirate, one of the seven different Emirates which comprise the United Arab Emirates (UAE), occupies an area of 67,340 km², 87% of the UAE, excluding the Islands. The total population of the Emirate at the end of 2002 was 1,215,218, an increase of 8% over the previous year. The Environmental Research and Wildlife Development Agency (ERWDA), based in Abu Dhabi, was established in 1996 and in the year 2000 was designated as the "Competent Authority" for environmental issues in the Emirate of Abu Dhabi.

One of the six strategic goals which comprise the current ERWDA Environmental Strategy Action Plan for the Emirate of Abu Dhabi, 2003-2007, is "a Management Regime for Water Resources".

As part of its overall mission to improve the management of water resources in the Emirate, ERWDA will publish its second annual Water Resources Statistics Bulletin. The purpose of the publication is to disseminate important, basic information on water resources sources and users in the Emirate of Abu Dhabi. As such, it is intended to benefit a wide audience, ranging from the general public to scientific research organizations

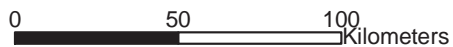
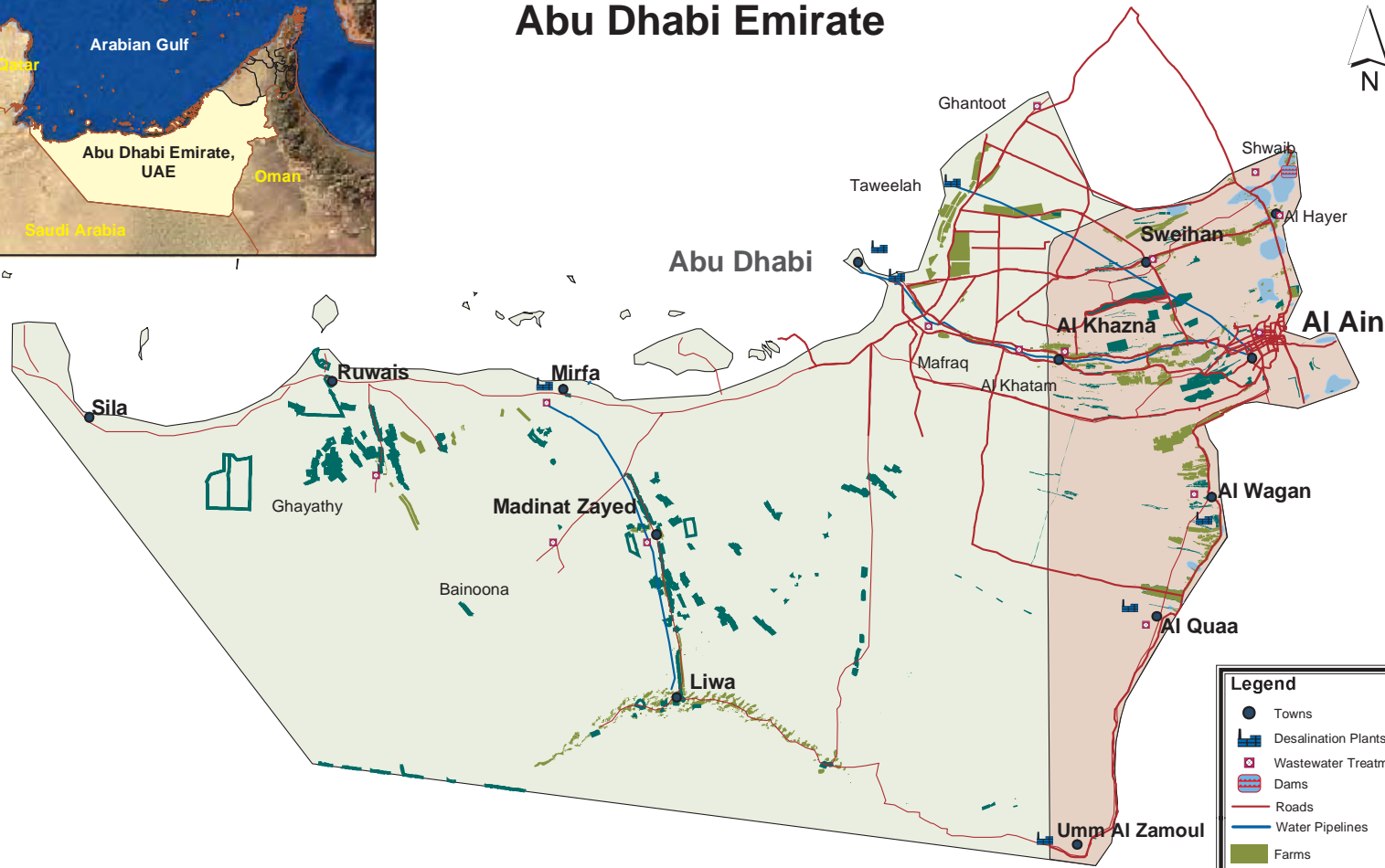
The first stage of ERWDA's action plan in satisfying its strategic goal of developing and implementing a water resources management plan for the Emirate of Abu Dhabi, is baseline information and ambient monitoring. ERWDA's

work will identify gaps and follow a process to fill all the gaps of missing information.

The water resources statistics bulletin will be updated annually by ERWDA.

ERWDA wishes to thank all stakeholders involved in the Water Resources Management Project who contributed data and information necessary for the publication of this bulletin

Abu Dhabi Emirate



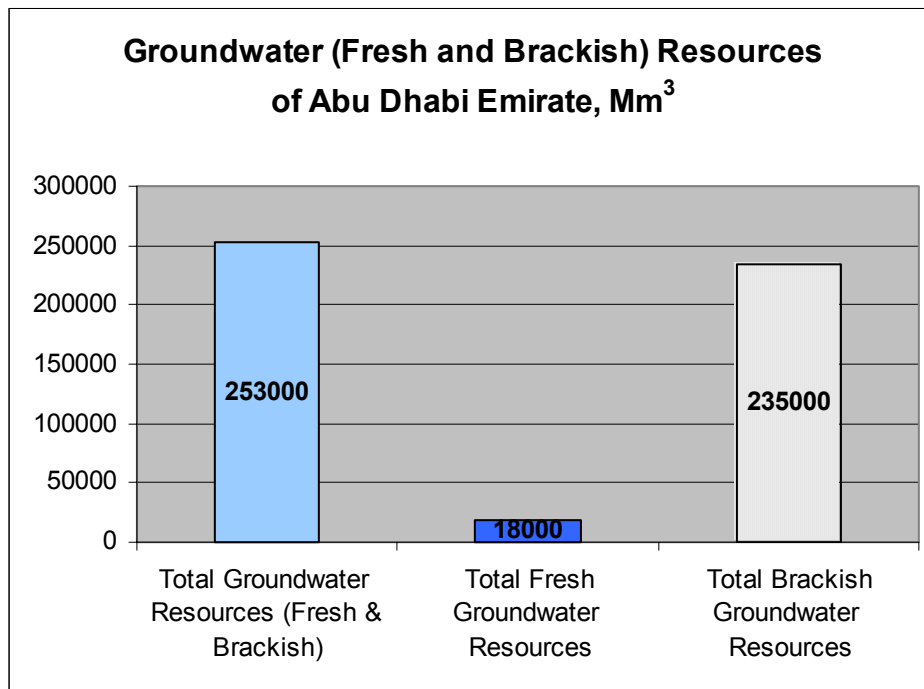
Legend	
●	Towns
■	Desalination Plants
□	Wastewater Treatment Plants
■	Dams
—	Roads
—	Water Pipelines
■	Farms
■	Forests
■	Domestic Supply wellfields
■	Eastern Region
■	Central & Western Region

GROUNDWATER RESOURCES

Groundwater, despite its heavy utilisation over the last 30 years, still provides the majority of the water source for Abu Dhabi Emirate. A total of 253,000 Mm³ occurs as a resource, but only 7% is fresh, the remainder brackish. Recharge to the aquifers in the Emirate is estimated at only 130 Million cubic meters (MCM) annually, which is only 4% of the total current water use.

Groundwater constitutes 81% (80% brackish, 1% Fresh) of all the Emirate's sources, followed by desalinated seawater (15%) and Treated Effluent (4%). Given declining water levels, and a general deterioration in groundwater quality, the protection and conservation of fresh groundwater is of vital importance.

Groundwater is mostly used in Agriculture, Forestry and Amenity/ Recreation irrigation. Only a small amount of groundwater is abstracted for municipal drinking water supply, however, there are still a large number of private household wells which abstract water for domestic use.



Source: NDC/USGS, Groundwater Resources of Abu Dhabi Emirate, 1996

Note : Mm³ = million cubic meters. One cubic meter = 1000 litres

RECHARGE DAMS & RESERVOIR PROJECTS

Abu Dhabi topography is not generally suitable for the construction of recharge dams which trap runoff from rainfall and allow its gradual release downstream in order to recharge groundwater reserves. In fact, only one recharge structure, a diversion bund with several downstream recharge basins, exists in the Emirate at Al Shwaib. The more mountainous terrain of the Northern Emirates is far more

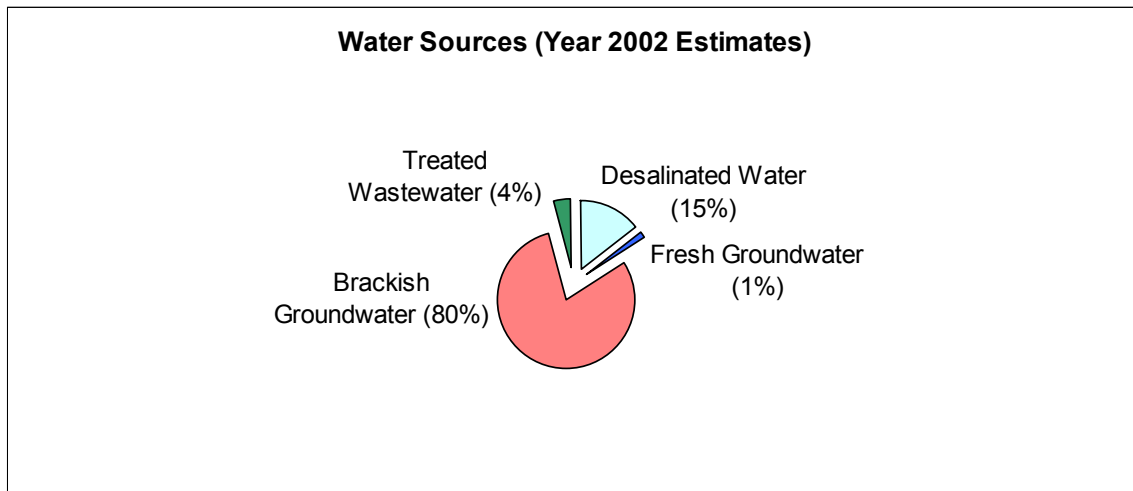
suitable for their construction; more than 60 dams have been constructed with a combined capacity of greater than 140 Mm³.

WATER PRODUCTION

An analysis of all water produced shows that the vast majority (81%) is abstracted from boreholes and shallow hand dug wells, the remainder is produced from desalination of seawater (15%) at four main plants situated along the Arabian Gulf coastline at Mirfa, Abu Dhabi, Um al Naar and Taweelah and from 22 Sewage Treatment plants (4%), the largest being Mafraq, 40km outside Abu Dhabi, which treats all domestic and Industrial sewer mains waste for Abu Dhabi Island and surroundings, catering for a population in excess of 500,000. Generally, a large proportion of all domestic & industrial wastewater is treated and re-used, but this forms only 4% of all water produced.

Due to declining water tables, there are now no totally natural flowing aflaj systems (traditional irrigation canals used for agriculture in Oasis areas) left in the Emirate; all those operating are either fully or partially supplemented from groundwater which is abstracted from nearby wells.

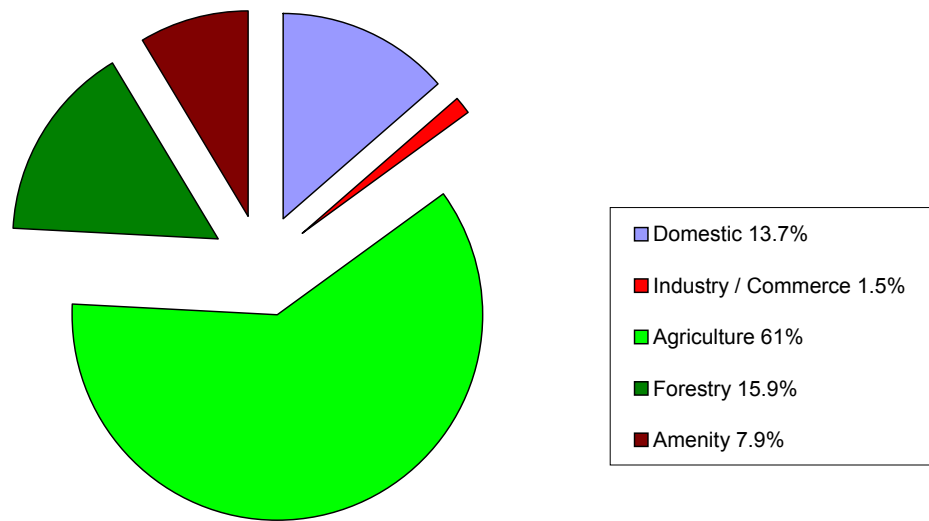
Water used for domestic purposes is abstracted from 16 wellfields (in the Eastern Region only – contributing only 6% of total domestic supply) and the bulk is supplied from the four main desalination plants described above, plus small desalination units which treat brackish water in the region south of Al Ain.



WATER CONSUMPTION

Water is consumed in the domestic, industrial, commercial, agricultural, forestry and amenity sectors.

Abu Dhabi Emirate Water Consumption 2002



Water of drinking quality, which meets the Abu Dhabi Emirates standards, as specified by the Regulation and Supervisory Bureau, is supplied for domestic, industrial and commercial use and accounts for only 15.2% of the total water resource consumed. By far the largest user (61%) of water is the agricultural sector, comprising over 20,000 small citizens farms and few, large state farms. Water used in this sector is mostly brackish in quality.

The second largest user of water is the Forestry sector, comprising over 250,000 hectares distributed amongst 247 separate plantations. Amenity irrigation for parks, gardens and recreational areas, accounts for 7.9% total water use. This sector relies mostly on treated effluent as a source.

Finally, the Industrial/Commercial sector, whilst expanding, still accounts for only 1.5% of all water consumed.

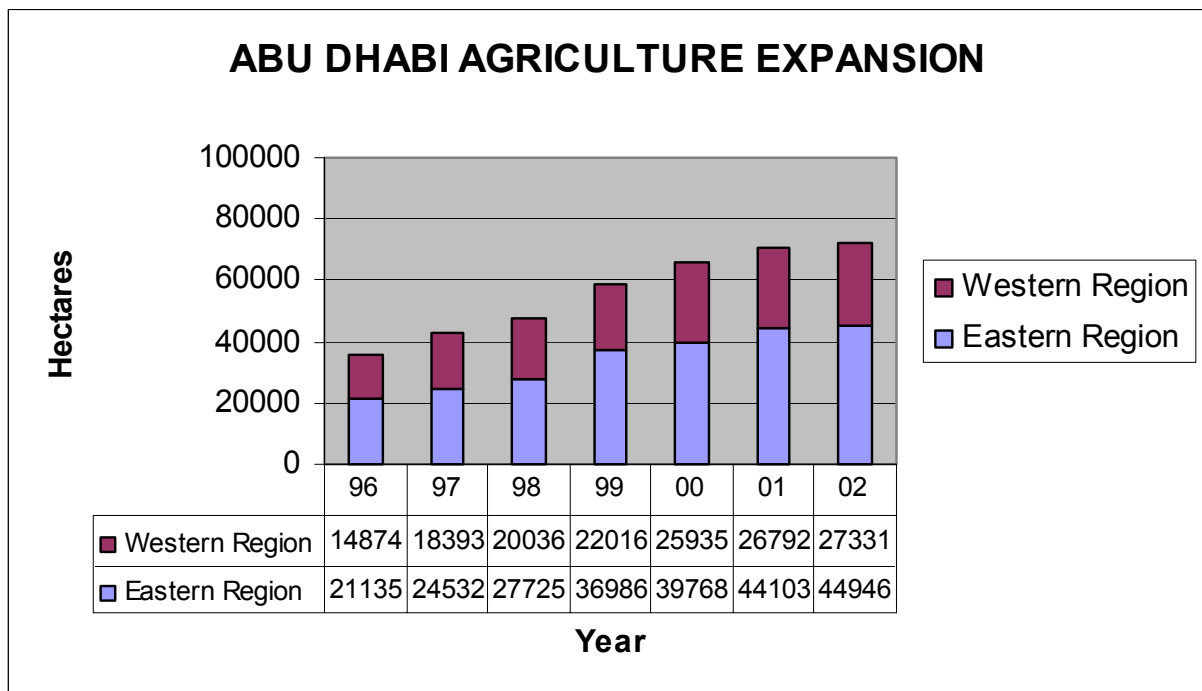
According to 2002 population statistics and figures for domestic water consumed within Abu Dhabi Emirate, the Emirate has a total per capita daily domestic water consumption of rate of 993 liters per person per day, currently the highest in the world.

Total Water Consumption 2002

Water Use Category	EASTERN REGION		WESTERN REGION		TOTAL ABU DHABI EMIRATE	
	(Mm3)	%	(Mm3)	%	(Mm3)	%
Domestic	107.81	7.1	332.8	19.6	440.6	13.7
Industry	11.9	0.78	36.9	2.2	48.8	1.5
Agriculture	1191	78.06	772.9	45.6	1963.9	61.0
Forestry	105	6.88	407	24.0	512.0	15.9
Amenity	110	7.21	145.98	8.6	256.8	7.9
TOTAL	1525.71	100	1695.58	100	3221.29	100.0

The total water consumed in the Emirate in 2002 is 3239 MCM compared with the last set of comprehensive water consumption estimates published for the Emirate, undertaken for the year 1994 by the USGS/NDC Groundwater Research Project, the following sectoral water use increases have been recorded in 2002: Domestic 80%, Agriculture & Amenity 345% and Forestry 153%. Large increases in areas under irrigated cultivation are the main cause of the increase, as shown below:

Abu Dhabi Agriculture Expansion 1996-2002



ERWDA's current joint initiative with the Abu Dhabi Water & Electricity Authority in water conservation and rationalization of use will help in working towards improving the management of water resources Abu Dhabi Emirate.

ERWDA has now nearly completed the first step of its 5 step process of developing and implementing a Water Resources Management Plan for the Emirate.

