UN WATER

Oman

UN-Water Country Brief

		year
Total population (UN Population Division)	2.9 million inhabitants	2012
Total area (FAO FAOSTAT)	309 500 km^2	
Population density	9 inhabitants/km^2	2012
Human Development Index (UNDP) (between 0 and 1; 1 is highest) Country rank (total 187 countries; 1 is highest) Gender Inequality Index (0 is equality between women and men; 1 is least equality)	0.731 84 0.328	2012
Water, sanitation and hygiene-related deaths % of total deaths (WHO)	1.1 %	2004
Long-term average annual precipitation (CRU CL 2.0)	125 mm/year	
Long-term average actual renewable water resources (FAO AQUASTAT)	1 400 million m^3/year	
Actual annual renewable water resources per capita (FAO AQUASTAT)	483 m^3/inhabitant	2012
% of total actual renewable freshwater resources withdrawn (MDG Water Indicator) (FAO AQUASTAT)	84 %	2003
Groundwater withdrawal as % of total freshwater withdrawal (FAO AQUASTAT)	100 %	2003
Total area equipped for irrigation (FAO FAOSTAT)	59 000 ha	2011
% of cultivated area equipped for irrigation (FAO FAOSTAT)	84 %	2011

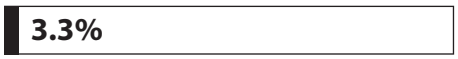
Water withdrawals by sector
(total 1 321 million m^3 in 2003) (FAO AQUASTAT)

The Money Stream

During 2001 to 2011, the government invested US$ 288.19 million (in constant 2010 US$) on average per year on water-related infrastructure and programmes. During the same period, official development assistance (ODA) gross disbursements amounted to US$ 0.08 million on average per year.

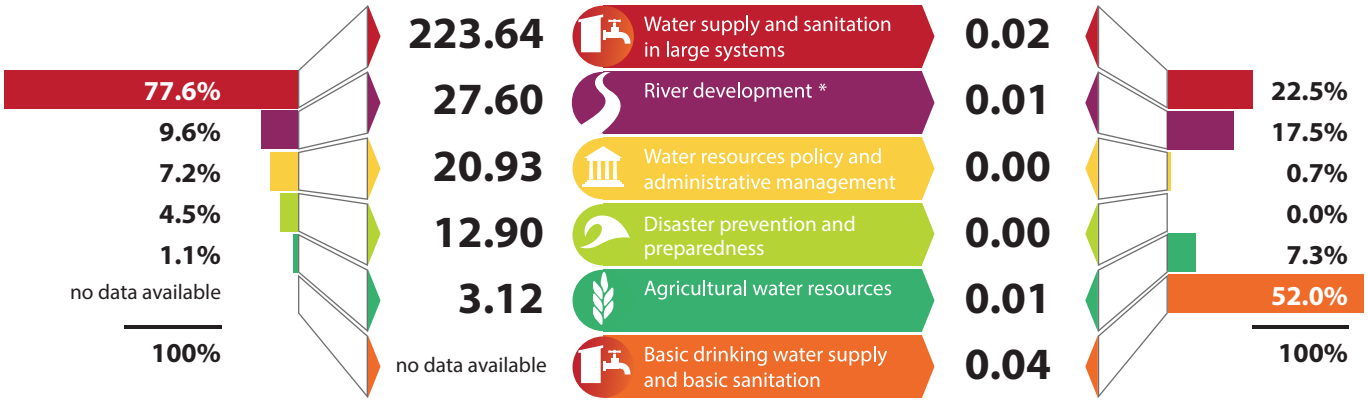
Throughout this period, the government's total water-related investments accounted for an estimated 3.3 percent of the government's total expenditures. Over three-quarters of government expenditure was channeled into water supply and sanitation-large systems (77.6 percent). Water supply and sanitation received the bulk of the ODA disbursements during this period (52 percent for basic water supply and sanitation and 22.5 percent for large systems), and river/wadis development was second in ODA priority (27.5 percent).

% of water-related to total government expenditure 2001-2009



Water-related government expenditure
during the period 2001 - 2010 and buget for the years 2011, in million constant 2010 US$ (average for all years)

Official development assistance gross disbursement
during the period 2001 - 2011, in million constant 2010 US$ (average for all years)



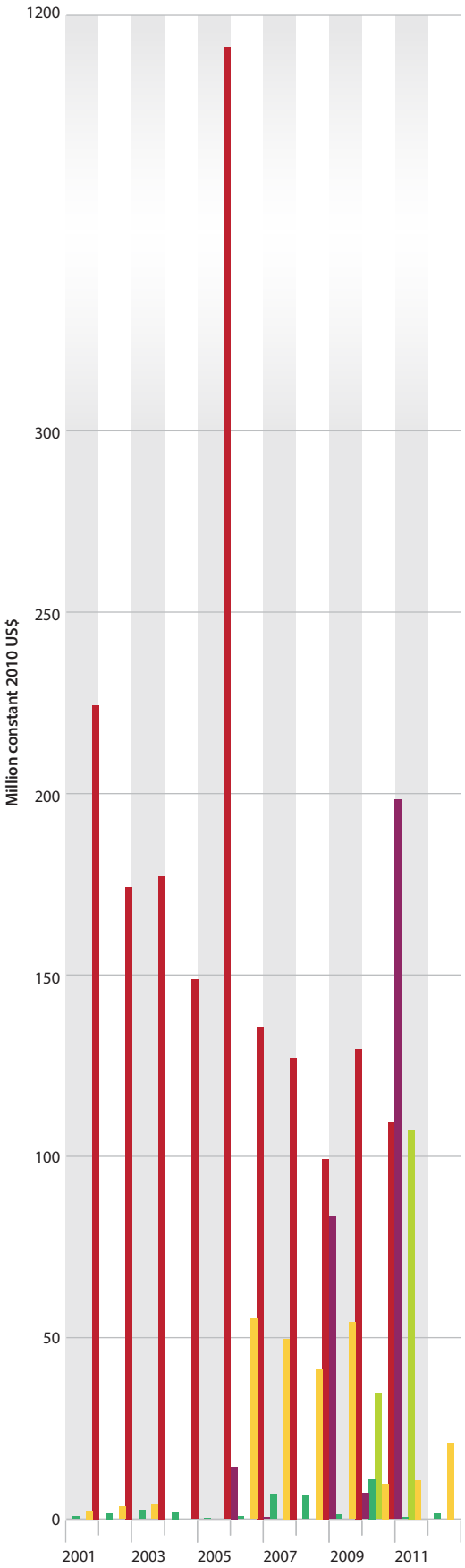
total annual average **288.19**

0.08 total annual average

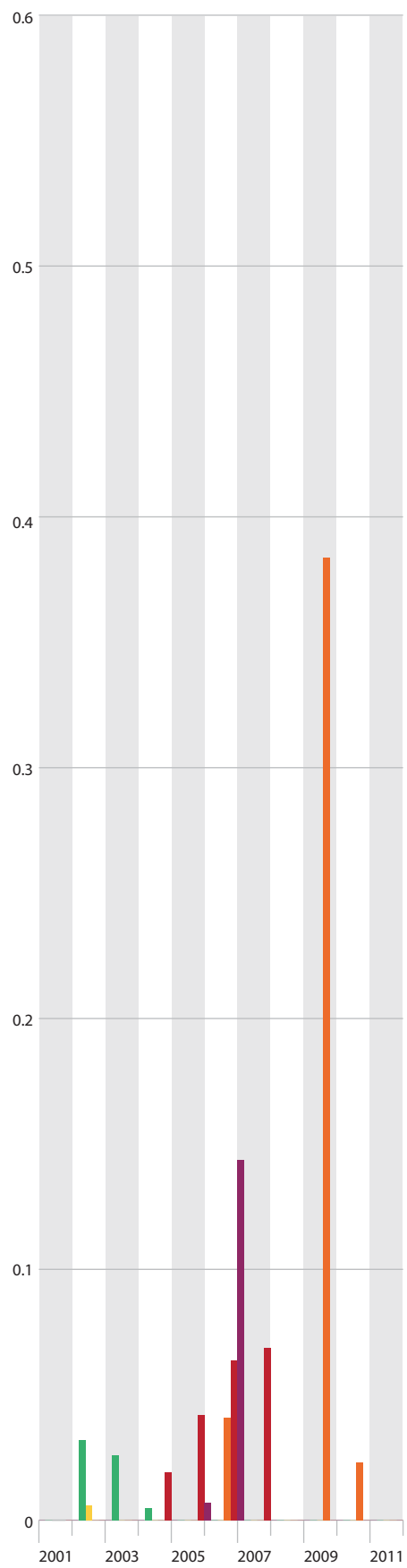
*Note: The category river development in government investments refers to the development of wadis.

Status and Trends

Water-related government expenditures (2001 to 2010) and budget (2011 to 2012), in million constant 2010 US$



Water-related official development assistance gross disbursement during the period 2001 to 2011, in million constant 2010 US$



Government water-related expenditure (2001-2010) and budget (2011-2012):

- Water supply and sanitation-large systems have had priority every year for which data is available (2001 - 2010).
- In 2011, the development of wadis (included in the category river development) received the bulk of water-related government expenditure.
- In recent years the river/wadis development as well as disaster prevention and preparedness have received increased investment priority.

Water-related official development assistance over the period 2001 to 2011:

- Overall, ODA is not a significant source of water-related investment in Oman.
- ODA peaked in 2007 and 2009 as a result of disbursements in river/wadis development and in basic water supply and sanitation respectively.

Actual expenditure refers to the amount spent by the government during a given year. Where actual expenditure is not available, the government budget is used and refers to the amount that the government reportedly budgeted for the given year. The OECD Creditor Reporting System categories were chosen for the collection of these water-related investments and the data was obtained by the WCB project through in-country research in cooperation with the government (during 2012), while ODA data stems from the OECD Creditor Reporting System (collected November 2012).

Water supply and sanitation in large systems: Water desalination plants; intakes, storage, treatment, pumping stations, conveyance and distribution systems; sewerage; domestic and industrial wastewater treatment plants.

Basic drinking water supply and basic sanitation: Water supply and sanitation through low-cost technologies such as hand-pumps, spring catchment, gravity-fed systems, rainwater collection, storage tanks, small distribution systems; latrines, small-bore sewers, on-site disposal (septic tanks).

Water resources policy and administrative management: Water sector policy, planning and programmes; water legislation and management; institution capacity building and advice; water supply assessments and studies; groundwater, water quality and watershed studies; hydrogeology. Excluding agricultural water resources.

Disaster prevention and preparedness/Flood protection and control: Disaster risk reduction activities such as developing knowledge, natural risks cartography, legal norms for construction; early warning systems; emergency contingency stocks and contingency planning including preparations for forced displacement. Floods from rivers or the sea; including sea water intrusion control and sea level rise related activities.

Agricultural water resources: Irrigation, reservoirs, hydraulic structures, groundwater exploitation for agricultural use.

***River development:** Integrated river basin projects; river flow control; dams and reservoirs. Excluding dams primarily for irrigation and hydropower and activities related to river transport.
*The category river development in government investments refers to the development of wadis.

Water - related Disasters*

Impact for development
There are two major and immediate consequences of climate change projected for Oman: first, rising sea levels will affect coastlines and marine life severely and could impact on desalination plants that are the source of freshwater. Second, rising temperatures result in increasing water demand and with falling freshwater levels and increasing salinity in seawater, which could further compound water scarcity. Cyclonic storms moving north eastward from the Indian Ocean affect all parts of the country. Two major tropical cyclones GUNO on 2007 and PHET in 2010 hit the eastern coastal areas.

Year	Deaths	Affected	Economic Damage (million US$)**
2007	61	60 000	4 200
2003	30	-	-
2002	9	100	25 000
1997	4	-	-
1989	2	-	-

(Dartmouth Observatory) - means no data available

* 'Water-related disasters' within the scope of this WCB study do not include droughts.

** Current price

Tracking Water Governance

Impact for development
In 2000, Oman adopted the National Water Resources Master Plan 2001-2020 to provide a framework for achieving sustainable development, management and conservation of water resources, with a planning horizon to 2020. In general, nations that prioritize water policies successfully improve their social and economic development.

Is the right to sanitation/drinking-water explicitly recognized in policy or law?

sanitation		drinking water	
urban	rural	urban	rural
Progressing with some elements in place	Progressing with some elements in place	Already fully recognized in law or policy	Already fully recognized in law or policy

Can people claim their human right to sanitation or drinking-water in a domestic court?

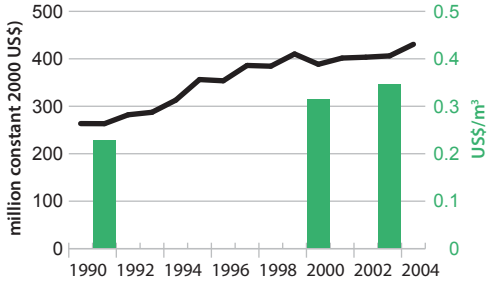
sanitation		drinking water	
urban	rural	urban	rural
Yes but little used	Yes but little used	Yes but little used	Yes but little used

UN-Water GLAAS (WHO, 2012)

Irrigated Agriculture

Impact for development
Agriculture was historically a central feature of Oman's economy, though in 2011/12, it contributed approximately 1.5 percent to GDP. In 2012, women accounted for 7 percent of the economically active population in agriculture. Rainfall in Oman is sparse, and is often below the required amount for crops. Consequently, irrigation is a fundamental component of the country's agricultural activity, and more than 80 percent of cultivated land is irrigated, all using groundwater. Irrigated cropping intensity is 129 percent. Agriculture is by far the largest water user, and while agricultural production has improved greatly, water shortage in some regions remain. Salinity has increased in wells and surface irrigation remains a limiting factors for productivity. Additionally, water scarcity generates high competition from different users and locations, so that water resources management is under increasing pressure to save and allocate water more efficiently and according to priorities.

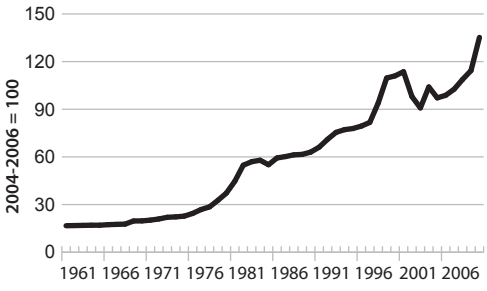
In 2004, about 20 percent of the area equipped for irrigation had pressurized irrigation systems (sprinkler and localized irrigation), also called "modern" irrigation in Oman, compared to just over 6 percent in 1993. According to the agricultural census 2004-2005, about half of the irrigated harvested area was covered by date palms and almost one quarter of the area was covered by fodder.



(World Bank and FAO AQUASTAT)

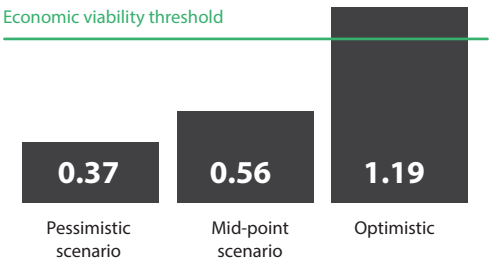
The value generated by agriculture per m³ of water increased 52 percent between 1991 and 2003.

Crop production index (World Bank)



The Oman government has traditionally supported irrigation and encourages the use of modern water-saving technologies, such as sprinkler and localized irrigation. Investments in irrigation technology and institutional support of the agricultural sector have paid off in terms of food security, as demonstrated by the increasing crop production index since 1961. While the total area equipped for irrigation has not increased over the last 20 years, the areas equipped with pressurized irrigation systems has more than tripled. Farmers do not pay for water, they only cover the costs of pumping.

Benefit-cost ratio



Accurate information on the economic viability of investments in new irrigation is relatively scarce. However, available information suggests that the economic viability of new irrigation schemes is only likely to be economically viable –under relatively optimistic circumstances. The analysis conducted here shows the results of a simple cost-benefit analysis for a new irrigation scheme for dates, using groundwater and localized irrigation. Capital costs can be relatively high due to the localized irrigation application techniques necessary in water-scarce environments, while ongoing energy and other variable costs are also relatively high. From an economic perspective, essentially investments may only be viable where significant gains in productivity are achieved, in conjunction with relatively low costs when compared to average irrigation costs. The main finding is that significant care must be exercised in determining the economic viability of irrigated agriculture in Oman.

Environment and Ecosystem Health

Impact for development
Groundwater contamination is one of the major problems facing Oman and of great concern for the Ministry of Regional Municipality and Water Resources (MRMWR), reducing the water resources available for use and also posing a threat to human health. The contaminants that have been identified are: synthetic organic chemicals, hydrocarbons, inorganic cations and anions, and pathogens. Hydrocarbon leakage from UST or oil pipelines is considered a significant threat to the groundwater in different areas. Agricultural development in the catchment, especially around recharge areas and along groundwater flow paths, has a two-fold negative impact on municipal well-fields: firstly, agricultural withdrawals compete directly with those of municipal supply and secondly, agricultural chemicals, such as fertilizer and pesticide residuals can, migrate to groundwater through the unsaturated zone.

	Score	Rank
Environmental Performance Index 2012*	44	110
Water (Effects on human health)	42.1	81
Water resources (Ecosystem effects)	29.4	74

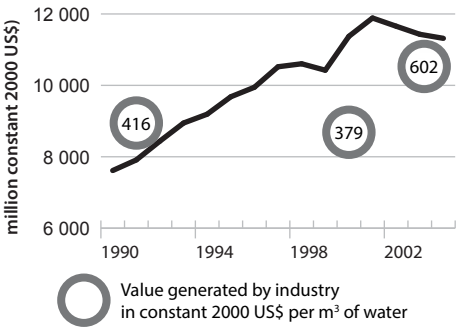
*A score of 100 indicates optimal performance. The 2012 Environmental Performance Index (EPI) ranks 132 countries on 22 performance indicators.

(YCELP/CIESIN/Columbia University, WEF, JRC/European Commission)

Several important aquifers exist in Oman, with internal groundwater the main reliable source of water for the country. Desalination of sea water or saline/brackish groundwater has become an important contributor to water supplies where natural water resources are unavailable or inadequate, and there are currently some 118 desalination plants to meet high water demand to cope with increase in population and on-going development schemes.

Water Intensity in Industry

Impact for development
During 1991 to 2000, the value generated by industry per m^3 of water decreased by about 1 percent annually, and during 2000 to 2003 this value increased by about 17 percent annually. Industrial water use is expected to increase further in response to policies encouraging diversion of the economy away from dependency on oil revenues, with industrial estates having been established in a number of regions, and major industrial projects being planned or implemented.



Value generated by industry in constant 2000 US$ per m^3 of water

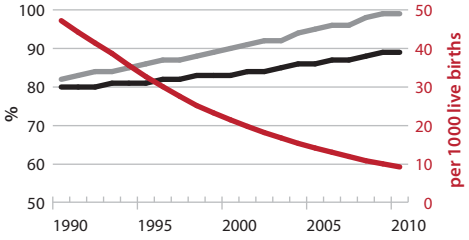
Value added by industry in million constant 2000 US$

(World Bank and FAO AQUASTAT)

Drinking Water Supply and Sanitation

Impact for development
The ongoing long-term national investments in water supply and sanitation have paid significant dividends in terms of health outcomes in Oman, with increases in access to water supply and sanitation highly correlated with reductions in infant mortality. Domestic water demand is expected to more than double by the year 2020, due to population growth and increased per capita demand. The comprehensive treatment of sewage is already established in Oman and can produce an effluent that complies with Omani Standards for Wastewater and Reuse, and be a valuable local contribution to water resources. The main use for the effluents is agriculture or municipal landscape irrigation.

Access to drinking water and sanitation & under-5 child mortality
(UN Inter-agency Group for Child Mortality Estimation (IGME) and WHO/UNICEF Joint Monitoring Programme)



Improved drinking water source
Improved sanitation facilities
(both indicators above in % of total population)
Under 5 child mortality rate
(probability of dying by age 5 per 1000 live births)

In 2010, 89 percent of the population was using an improved drinking water source (78 percent of the rural and 93 percent of the urban population). Over the period between 1990 and 2010, use of an improved drinking water source has increased slightly, representing an overall increase of 9 percent for the entire population and those in urban areas, and a 6 percent increase of use of an improved drinking water source in rural areas.

Use of improved sanitation facilities has improved substantially, particularly in rural areas, from 55 percent of the rural population to 95 percent of the rural population (40 percent increase overall in 2010). All urban residents use improved sanitation facilities. This investment in sanitation facilities has significantly closed the gap between urban and rural areas in Oman. The level of investment in sanitation facilities has clearly had significant payoffs in terms of reduced child mortality in Oman, with a 37.9 percent decrease in infant mortality overall between 1990 and 2010.

Ratification of the International Covenant on Economic, Social and Cultural Rights (ICESCR):
not ratified

(The right to water is implicit within the right to an adequate standard of living and inextricably related to the right to the highest attainable standard of health outlined in the ICESCR.)

Water service indicators
during the period 2001-2010

Indicator (million m^3/year)	2001	year 2005	2010
Production of desalinated water	55	104	200
Treated municipal wastewater	12	40	50

Rapid Assessment

Overall

Pressures on water

The growing economy has brought an increase in urbanization with a demand for high levels of service and quality for water supplies. The accompanying requirement for foodstuffs has led to a major expansion of groundwater-based agriculture over the last 50 years, beyond that of the traditional aflaj areas, so that water demand in the agricultural sector has tripled, creating imbalances between the water resources consumption rate and water availability. Water demand is expected to further increase during the next 20 years as a result of increasing population from 2.85 to 3.5 million, alongside the increasing rate of urbanization and changing diets and, consequently, increasing water demands. The balancing of this deficit is considered a main challenge for the country. The National Water Resources Master Plan for the period 2001-2020 concluded that there is a requirement for an additional supply and/or adjustment of water use to yield overall about 330 million m^3/year in order to meet future additional priority demands and restore the existing deficit during the Master Plan period.

Investments

Oman's water security is at high risk due to the scarcity of water in the country. During the last decade the government has expanded its investment in water infrastructure through the National Water Resources Master Plan, which aims to secure water supply and improve water infrastructure by the year 2020. The total investment is expected to reach US$ 7 530 million over the next two decades. During the current 5 year plan Oman has invested in excess of US$ 3 800 million.

Assessments

Irrigated agriculture ●●●○○

There are high levels of water use by farmers. The government has allocated some investment in improving supply management, which aims to increase the availability of water resources by constructing dams in the main wadis. More efforts have also been given to improve water demand management by improving irrigation water use efficiency through the use of water saving devices. These efforts have had a positive impact in food production and in stabilizing food prices.

Drinking water supply and sanitation ●●●●○

In 2010, 11 percent of the population still does not use an improved drinking water source, but 99 percent use improved sanitation facilities. Seventy-two percent of national water-related funds have been channeled into large water supply and sanitation systems.

Water intensity in industry ●●●●○

The value generated by industry per m^3 of water has increased by about 59 percent between 2000 and 2003.

Water-related disasters insufficient data ○○○○○

Insufficient data/ data not available for analysis.

Environment and ecosystem health ●○○○○

The water balance shows that in many areas demand for water exceeds natural replenishment. In coastal areas, over-withdrawal has led to saline water intrusion and a deterioration in water quality. The increasing salinity is probably the single most economically devastating water resource problem facing the country at present. The use of agrochemicals, both fertilizers and pesticides, is a widespread and potentially serious hazard to groundwater quality, although the government has passed many laws.

Tracking governance ●●●●○

Adoption of the National Water Resources Master Plan 2001-2020. Since 1973, over 50 separate pieces of environmental legislation have been enacted in connection with various aspects of the environment, covering topics from the protection of fish, flora and fauna, to waste disposal and quality standards for drinking water and the reuse of treated sewage effluent.

Data Quality

★★★☆☆

Data is dated; only available for the first years of the 21st century. Limited availability of data to assess economic viability of expanding irrigation.

★★★★☆

Data is available

★★☆☆☆

Insufficient data available

★☆☆☆☆

Insufficient data available

★★★★☆

By the end of 2010, the hydrometric monitoring network reached more than four thousands (4680) monitoring points in addition to a telemetry network that consists of 27 stations particularly located in remote areas. The monitoring data is used to assess, develop and manage the water resources.

★★☆☆☆

Insufficient data available

Legend:

The rapid assessment of the situation above, based on available data, was established in conjunction with in-country experts and officials. It provides an overview of trends according to the following:

●○○○○ trends are of significant concern

●●○○○ trends are of concern

●●●○○ trends are stable or, progressing on certain issues but not on others

●●●●○ trends show some measure of improvement in all relevant indicators assessed

●●●●● trends show significant improvement and there is no concern

○○○○○ insufficient data

Accurate assessments of progress require relevant, accurate and timely data. The above data quality assessment ranges from:

★☆☆☆☆ very poor → ★★★★★ very good

Data Concerns

Data is a vital input to water management and investment in water-related infrastructure and projects. The lack of quality and reliability of physical data in a country makes water-related investment decisions inherently more complex and investments more risky for investors.

In addition to an assessment of priority data needs from the basis of national decision-makers and international investors (donors and loan capital) it is prudent for countries to establish a forward work programme of data management. Modest investments in coordinated data collection, collation, analysis and dissemination are vital to demonstrate the benefits of water-related investments to governments, donors and ultimately private capital investors.

Although Oman has an extensive hydrometric monitoring network, the climatic and other agronomic conditions in Oman can make investments in irrigation risky. It would be prudent to enhance data and information to reduce investment risks for future irrigation investment programmes.

It is to be noted that it is virtually impossible to find national-level gender-disaggregated data for almost all themes contained in the UN-Water Country Briefs.

UN WATER

This project was implemented by the AQUASTAT Programme of the Food and Agriculture Organization of the United Nations (FAO) on behalf of UN-Water with financial support from United States Department of State (USDS). Brief produced: 3 June 2013

Additional information on the project, data and methodologies can be accessed at:

http://www.unwater.org/WaterCountryBriefs.html

OMAN **FAO - AQUASTAT, 2008**

Disclaimers

- The most recent and updated information can be found in the original databases cited throughout.
- The rapid assessment methodology presented here is an advocacy tool designed to generate debate and attention to the issues, and is developed in conjunction with national government focal points.
- Data presented herein stems either from existing databases or was collected from national reports, experts and institutions, and in some cases raw data underwent various manipulations to categorize the information for this presentation.
- Due to data limitations, the investment-related estimates may not include water-related investments that are counted under other categories of investments, and some investment categories (ie: disaster prevention and preparedness) may include some investments that are not directly water-related. Moreover, water being a crosscutting issue, investments in other parts of the government (not calculated here) may also benefit water management.
- The words investments/invested/funded for ODA refer to gross disbursements of ODA according to the OECD definitions. The words investments / invested / funded for government refer to government actual water-related government expenditure (2001 to 2010) and budget (2011 to 2012). In addition, investment data and analysis do not include any other forms of investment (such as, private sector investments).
- The benefit-cost analysis on expansion of irrigation is based on very limited data and any decisions should be based on detailed cost-benefit analysis that incorporates all relevant local data.