

Oman



GEOGRAPHY, CLIMATE AND POPULATION

Geography

The Sultanate of Oman occupies the south-eastern corner of the Arabian Peninsula and has a total area of 309 500 km². It is bordered in the northwest by the United Arab Emirates, in the west by Saudi Arabia and in the southwest by Yemen. A detached area of Oman, separated from the rest of the country by the United Arab Emirates, lies at the tip of the Musandam Peninsula on the southern shore of the Strait of Hormuz. The country has a coastline of almost 3 165 km, from the Strait of Hormuz in the north to the borders of the Republic of Yemen in the southwest, overlooking three seas: the Persian Gulf, the Gulf of Oman and the Arabian Sea.

Administratively the country comprises five regions (A Dakhiliyah, Al Batinah, Al Wusta, Ash Sharqiyah and Al Dhahirah) and four governorates (Muscat, Musandam, Dhofar and Al Buraymi). It can be divided into the following physiographic regions:

- The coastal plain. The most important parts are the Batinah Plain in the north, which is the principal agricultural area, and the Salalah Plain in the south. The elevation ranges between 0 near the sea to 500 metres further inland.
- The mountain ranges, which occupy 15 percent of the total area of the country. There is the mountain range that runs from Musandam in the north to the Ras Al-Hadd in the southeast. In the north close to the Batinah Plain is the Jebel Al Akhdar with a peak of 3 000 metres. Other mountains are located in the Dhofar province, in the extreme southern part of the country, with peaks from 1 000 to 2 500 metres.
- The internal regions. Between the coastal plain and the mountains in the north and south lie the internal regions, with elevations not exceeding 500 metres. This part covers 82 percent of the country with mainly desert, sand and gravel plains. It includes part of the Rub' al Khali, also known as the Empty Quarter or the Great Sandy Desert.

The soils are coarse textured (sandy or coarse loamy) with a high infiltration rate. The soil pH is moderately to strong alkaline and the organic matter is very low.

The cultivated area was 58 850 ha in 2004, of which 12 793 ha consisted of annual crops and 46 057 ha of permanent crops (Table 1). Oman counts five distinct agricultural regions. Going roughly from north to south, they include the Musandam Peninsula, the Batinah coast, the valleys and the high plateau of the eastern region, the interior oases, and the Dhofar region. Over half of the agricultural area is located on the Batinah Plain in the north covering about 4 percent of the area of the country.



OMAN

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TABLE 1
Basic statistics and population

Physical areas			
Area of the country	2005	30 950 000	ha
Cultivated area (arable land and area under permanent crops)	2004	58 850	ha
• as % of the total area of the country	2004	0.19	%
• arable land (annual crops + temp. fallow + temp. meadows)	2004	12 793	ha
• area under permanent crops	2004	46 057	ha
Population			
Total population	2005	2 567 000	inhabitants
• of which rural	2005	21.3	%
Population density	2005	8.3	inhabitants/km ²
Economically active population	2005	977 000	inhabitants
• as % of total population	2005	38.1	%
• female	2005	17.3	%
• male	2005	82.7	%
Population economically active in agriculture	2005	317 000	inhabitants
• as % of total economically active population	2005	32.4	%
• female	2005	6.6	%
• male	2005	93.4	%
Economy and development			
Gross Domestic Product (GDP) (current US\$)	2006	35 730	million US\$/yr
• value added by agriculture (% of GDP)	2000	2	%
• GDP per capita	2004	9 583	US\$/yr
Human Development Index (highest = 1)	2005	0.814	
Access to improved drinking water sources			
Total population	2000	82	%
Urban population	2000	85	%
Rural population	2000	73	%

Climate

Generally, the climate is considered to be arid and semi-arid but differs from one region to another. It is hot and humid during summer in the coastal areas and hot and dry in the interior regions with the exception of some higher lands and the southern Dhofar region, where the climate remains moderate throughout the year. Potential evaporation varies from 1 660 mm/year on the Salalah plain in the south to 2 200 mm/year in the interior. In the north and centre of Oman rainfall occurs during the winter, from November to April, while a seasonal summer monsoon, from June to September, occurs in the southern parts of the country (Dhofar) causing a temperature change. The volume of average annual rainfall of the country has been estimated at 19.25 km³, which is equal to 62 mm (Ministry of Regional Municipalities, Environment and Water Resources, 2005), varying from less than 20 mm in the internal desert regions to over 300 mm in the mountain areas.

Population

The total population is 2.57 million (2005), of which around 21 percent is rural (Table 1). Population density is thus a little more than 8 inhabitants/km². The annual demographic growth rate was estimated at 2.9 percent between 1990 and 2000 and 1 percent between 2000 and 2005.

In 2000, 82 percent of the population had access to improved drinking water sources (85 and 73 percent for urban and rural populations respectively). The sanitation coverage was 97 percent for the urban population in 2006.

ECONOMY, AGRICULTURE AND FOOD SECURITY

Agricultural production played a significant role in the national economy in the period preceding the discovery of oil. Nowadays the national economy is dominated by its dependence on crude oil. In 2006 the Gross Domestic Product (GDP) was

US\$35.7 billion, and agriculture accounted for almost 2 percent of GDP (2000). The economically active population is 977 000 (2005) of which 83 percent is male and 17 percent female. About one-third of this is economically active in agriculture, of which 93 percent is male and 7 percent female (Table 1).

The contribution of local agricultural products to food security is almost constant: 36 percent of the total consumption, in spite of the increase in population and the decrease of the harvested crop land from 72 000 ha in 2000 to 63 606 ha in 2004 because of drought and changes in land use policy. All cultivated areas are irrigated and the main crops are dates (more than half of the cultivated area) and fodder (more than one-fifth). While agricultural production has improved greatly, water shortage in some regions, salinity increase in wells and surface irrigation are limitative factors in terms of productivity.

Agricultural production takes place predominantly on small farm units. More than 91 percent of the total farm holdings occupy less than 5 ha and cover more than 52.4 percent of the total cropped land. Production is market-oriented and uses new farming technologies including hybrid seeds, commercial fertilizers and pesticides, mechanization and water saving irrigation systems.

WATER RESOURCES AND USE

Water resources

Total internal renewable water resources are estimated at 1.4 km³/year (Table 2). About 1.05 km³ is surface water and 1.3 km³ groundwater, while 0.95 km³ is considered to be the overlap between surface water and groundwater.

Several important aquifers exist in Oman. The main aquifer systems include the alluvial aquifers, the regional quaternary aquifers, the aquifers of the Hadramawt Group and the aquifers of the Fars Group. Some of these aquifer systems are part of large regional aquifers that extend throughout the Middle East. Fresh groundwater is mostly available in the northern and southern extremities of Oman where precipitation and recharge occur. Most of the groundwater in other areas is brackish to saline. There are several hundred springs in Oman and most of them are located in the mountainous areas. These springs vary according to their discharge, temperature and water quality (Ministry of Regional Municipalities, Environment and Water Resources, 2005).

TABLE 2

Water: sources and use

Renewable freshwater resources			
Precipitation (long-term average)	-	62	mm/yr
	-	19.19	10 ⁹ m ³ /yr
Internal renewable water resources (long-term average)	-	1.400	10 ⁹ m ³ /yr
Total actual renewable water resources	-	1.400	10 ⁹ m ³ /yr
Dependency ratio	-	0	%
Total actual renewable water resources per inhabitant	2005	545	m ³ /yr
Total dam capacity	2006	88.38	10 ⁶ m ³
Water withdrawal			
Total water withdrawal	2003	1 321	10 ⁶ m ³ /yr
- irrigation + livestock	2003	1 168	10 ⁶ m ³ /yr
- municipalities	2003	134	10 ⁶ m ³ /yr
- industry	2003	19	10 ⁶ m ³ /yr
• per inhabitant	2003	526.1	m ³ /yr
Surface water and groundwater withdrawal	2003	1 175	10 ⁶ m ³ /yr
• as % of total actual renewable water resources	2003	83.9	%
Non-conventional sources of water			
Produced wastewater	2000	90	10 ⁶ m ³ /yr
Treated wastewater	2006	37	10 ⁶ m ³ /yr
Reused treated wastewater	2006	37	10 ⁶ m ³ /yr
Desalinated water produced	2006	109	10 ⁶ m ³ /yr
Reused agricultural drainage water		-	10 ⁶ m ³ /yr

The main reliable source of water is internal groundwater. Apart from some significant wadis like Dayqah and Quriyat that have an average flow of 60 million m³/year or Halfayn which covers a catchment area of 4 373 km² (Ministry of Regional Municipalities, Environment and Water Resources, 2005), in nearly all wadis surface water runoff only occurs for some hours or up to a few days after a storm, in the form of rapidly rising and falling flood flows. Since the infiltration capacity of coarse alluvium and fissured rock is high, groundwater can be recharged quite easily.

Oman has large amounts of water in aquifers that were replenished a long time ago when wet climate conditions prevailed. The present recharge is very low, if any. Those non-renewable resources exist in the Dhofar (Najd), Al Dahra (Al Massrat) and Sharqia (Rimal al Sharqia) regions. The government decided to use those aquifers to supply water for urban use and as a reserve for the future.

Since 1985, 31 major recharge dams have been constructed together with many smaller structures in order to retain a portion of the peak flows, thus giving more scope for groundwater recharge. In 2006, the total dam capacity was 88.4 million m³. A 100 million m³ dam is under construction and expected to be finished in 2009.

Desalination plants make an important contribution to water supplies where natural water resources are inadequate. Sea water desalination in Oman started to supply potable water to Muscat and the coastal area in the early 1970s. In 2002, the total installed gross desalination capacity (design capacity) was 322 579 m³/day or 118 million m³/year (Wangnick Consulting, 2002). The total production is around 109 million m³/year (2006), whereas it was 34 million m³ in 1995. The desalination plants should provide 80 percent of the potable water supply by the year 2010.

In 2000, the total produced wastewater was 90 million m³. In 2006, 37 million m³ were treated and reused. The use of treated effluent is limited to landscape irrigation using sprinkler, drip and bubbler systems. The Muscat Municipality has major plans to extend its sewage collection and treatment system. At present the total water treatment in the municipality is about 25 000 m³/day but in the near future 70 000 m³/day should be generated. Treatment plants exist in each region. The recent water treatment station built in Salalah city (south of Oman) will produce about 40 000 m³/day. The effluent undergoes an effective tertiary treatment, one of the best in the world according to world standards in this field.

Water use

In 2003, the total water withdrawal was 1 321 million m³ of which 88.4 percent was withdrawn for agricultural purposes, 10.1 percent for municipal purposes and 1.5 percent for industrial purposes (Table 2, Figure 1 and Figure 2).

The water balance shows that in many areas demand for water exceeds natural replenishment. For instance in coastal areas, over withdrawal has led to saline water intrusion and a deterioration in the water quality. At present, groundwater depletion is estimated at around 134 million m³/year.

As traditional water structures, the Al Zaijrah and Birkat systems have a particular importance in Oman

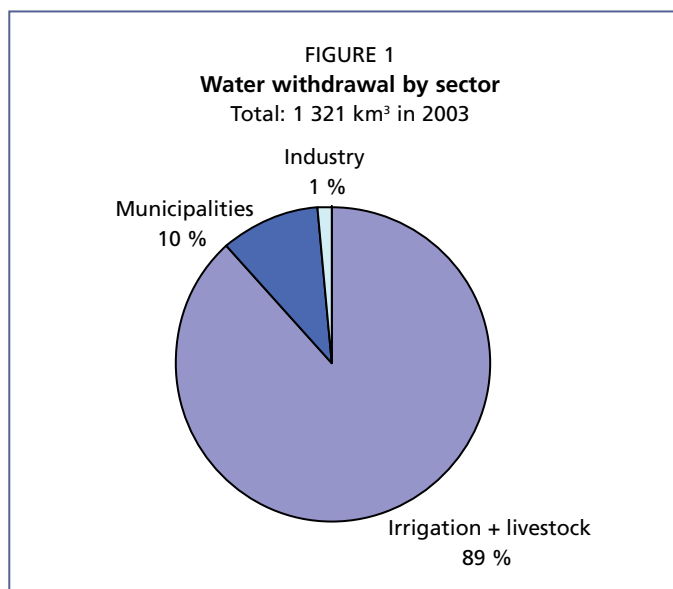
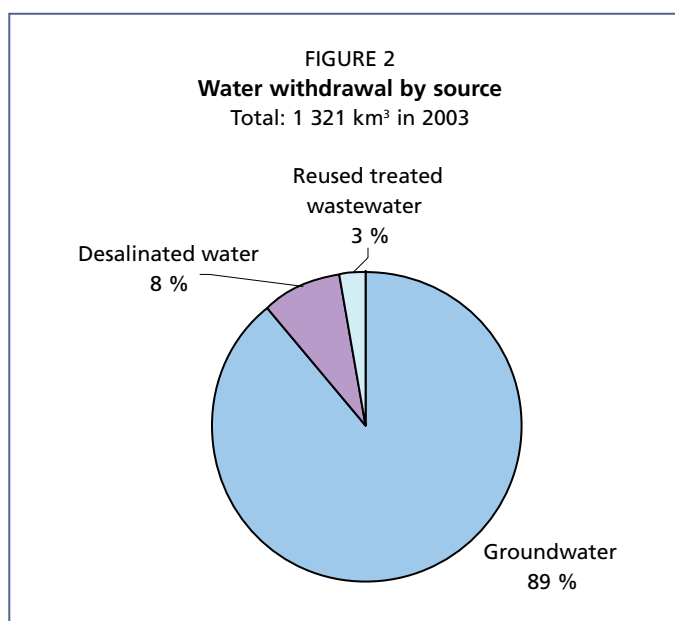


TABLE 3
Irrigation and drainage

Irrigation potential	-	-	ha
Irrigation			
1. Full or partial control irrigation: equipped area	2004	58 850	ha
- surface irrigation	2004	46 658	ha
- sprinkler irrigation	2004	6 654	ha
- localized irrigation	2004	5 538	ha
• % of area irrigated from surface water	2004	0	%
• % of area irrigated from groundwater	2004	100	%
• % of area irrigated from mixed surface water and groundwater	2004	0	%
• % of area irrigated from mixed non-conventional sources of water	2004	0	%
• area equipped for full or partial control irrigation actually irrigated		-	ha
- as % of full/partial control area equipped		-	%
2. Equipped lowlands (wetland, ivb, flood plains, mangroves)		-	ha
3. Spate irrigation		-	ha
Total area equipped for irrigation (1+2+3)	2004	58 850	ha
• as % of cultivated area	2004	100	%
• % of total area equipped for irrigation actually irrigated		-	%
• average increase per year over the last 11 years	1993-2004	-0.41	%
• power irrigated area as % of total area equipped	2004	84.1	%
4. Non-equipped cultivated wetlands and inland valley bottoms		-	ha
5. Non-equipped flood recession cropping area		-	ha
Total water-managed area (1+2+3+4+5)	2004	58 850	ha
- as % of cultivated area	2004	100	%
Full or partial control irrigation schemes			
Criteria			
Small-scale schemes	< 2 ha	2004	23 456 ha
Medium-scale schemes		2004	22 548 ha
Large-scale schemes	> 8 ha	2004	12 847 ha
Total number of households in irrigation		1993	62 411
Irrigated crops in full or partial control irrigation schemes			
Total irrigated grain production (wheat and barley)	2004	4 162.6	metric tonnes
• as % of total grain production	2004	100	%
Harvested crops:			
Total harvested irrigated cropped area	2007	67 087	ha
• Annual crops: total	2007	12 661	ha
- Wheat	2007	311	ha
- Barley	2007	1 171	ha
- Sorghum	2007	2 346	ha
- Other cereals	2007	3 256	ha
- Potatoes	2007	310	ha
- Sugar cane	2007	40	ha
- Vegetables	2007	5 229	ha
• Permanent crops: total	2007	54 426	ha
- Date palms	2007	32 759	ha
- Bananas	2007	2 436	ha
- Fodder	2007	15 817	ha
- Citrus fruits	2007	1 232	ha
- Coconuts	2007	449	ha
- Other perennial crops	2007	1 733	ha
Irrigated cropping intensity (on full/partial control area equipped)	2004	108	%
Drainage - Environment			
Total drained area	2006	0	ha
- part of the area equipped for irrigation drained	2006	0	ha
- other drained area (non-irrigated)	2006	0	ha
• drained area as % of cultivated area	2006	0	%
Flood-protected areas		-	ha
Area salinized by irrigation		-	ha
Population affected by water-related diseases		-	inhabitants

(Ministry of Regional Municipalities, Environment and Water Resources, 2005):

- Al Zaijrah is a system in which water is extracted from a dug well, originally by using animals, which was the main traditional method of lifting water for agriculture from dug wells till the introduction of pumps in the 1950s. The Zaijrah consists of one or two Manjur (well-wheels) made from individual wedge-like sections of acacia wood, which are fitted around a central hub and bound tightly with strips of leather or shark skin.
- A Birkat is a cistern, which is a traditional system designed to collect and store rainfall-generated flows. It comprises an excavated chamber or a naturally occurring hollow structure. For centuries the utilization of birkats has been vital for the survival and development of many remote settlements in the Musandam peninsula where they serve as the only source of water to meet domestic and livestock requirements.

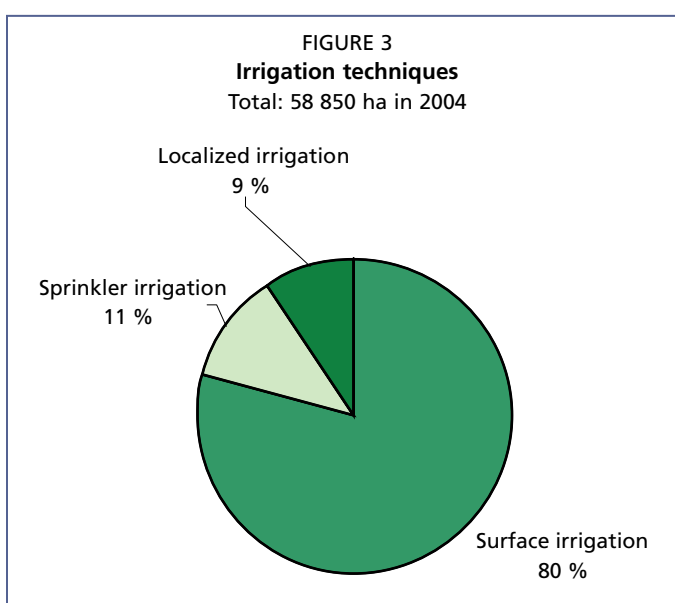


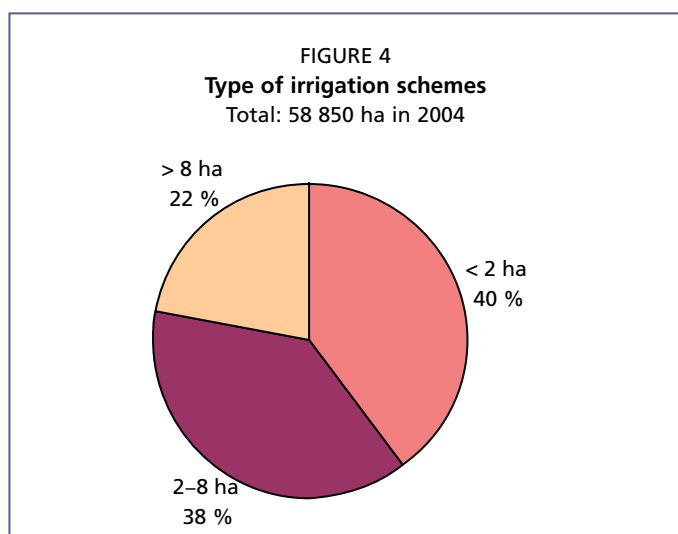
IRRIGATION AND DRAINAGE DEVELOPMENT

Evolution of irrigation development

Although 2.2 million ha are considered suitable for agriculture, there is no figure on the irrigation potential taking into consideration both land and water resources. All agriculture in Oman is irrigated and the equipped area increased from about 28 000 ha in the 1970s to 61 550 ha in 1993, of which 34 930 ha, or almost 57 percent, was located in the Al Batinah province in the north. In 2004, the equipped area for irrigation was 58 850 ha, of which over 50 percent was located in Batinah region.

All areas equipped for irrigation are irrigated from groundwater sources (wells, Falaj). While the area under sprinkler and localized irrigation has tripled over the last 10 years, the traditional surface irrigation system remains the most common irrigation technique covering almost 80 percent of the area equipped for irrigation (Table 3 and Figure 3). Sprinkler and localized irrigation systems, also called modern irrigation systems as opposed to traditional surface or flood irrigation systems, are mainly found on new farms. Half of them were subsidized by the government, meaning that the Ministry of Agriculture and Fisheries (MAF) is following up its efforts to introduce modern irrigation techniques. In order to encourage farmers to take up the new techniques,





the MAF has approved financial and technical assistance to small farmers. The feasibility of modern irrigation systems has been proven as well as their good results on yield increase and water saving.

In 2004, small schemes (< 2 ha) covered 40 percent of the total equipped area for irrigation, medium size schemes (2-8 ha) 38 percent and large schemes (>8 ha) 22 percent (Figure 4).

In most parts of Oman irrigation systems have been improved gradually which is reflected by the increase in agricultural production: first with the improvement of the water lifting device, then with cemented lined channels and then with piped systems.

The falaj system ('aflaj' in plural) is the traditional method developed centuries ago for supplying water for irrigation and domestic purposes. Many of the systems currently in use are estimated to be over a thousand years old. The falaj comprises the entire system:

- i. the source, which might be the upper reaches of wadis from which water is diverted, a qanat, or a spring;
- ii. the conveyance system, which is usually an open earth or cement-lined ditch;
- iii. the delivery system.

The falaj has assumed a social significance and well established rules of usage, maintenance and administration have evolved. Based on the source, three types of falaj can be distinguished:

1. the Ghaily falaj, which is a simple diversion and canalization of surface wadi flow; it uses normally open channels to collect and transfer the water; it dries out after long periods of drought with low rainfall since it depends on a shallow underground water table;
2. the Iddi or Dawoodi falaj, also called qanat, which is a very ancient system for extracting water from the water table by gravity, through a nearly horizontal gallery; this type of falaj has a system of deep and long channels, the lengths of which sometimes extend to 16 km, while the whole falaj network may reach 45 km;
3. the Aini falaj, which is a simple canalization of springs.

The flow of water in a falaj system is continuous and the distribution of water is divided into periodic units by the owner of the falaj. According to the national falaj inventory undertaken in 1997, the total number of working aflaj in the Sultanate is 3 017, covering a total irrigation area of 21 606 ha (Table 4). The mean annual flow of these aflaj is about 552 million m³ and water losses are estimated at about 128 million m³/year. Water quality is high, even though in a few cases salinity reaches 1 500 µS/cm.

Both hand-dug and tubewells are increasingly being constructed to supplement the falaj water, especially in the coastal areas. In 1993, for 47 percent of the total number of 62 411 households involved in irrigation, wells were the main source of water, 39 percent relied on falaj water, while the remaining 14 percent had access to both sources. Water pumping through wells now represents 67 percent of total groundwater withdrawal, while falaj water represents 33 percent. About 84 percent of the total area equipped for irrigation is power irrigated.

TABLE 4
Distribution of Falaj in Oman by region according to the National Falaj inventory, 1997

Regions	Al Batinah	Al Dhakliyah	Al Dhahera	Al Sharqiah	Musqat	Total
Area (ha)	5 594	7 895	3 527	4 326	225	21 606
No Falaj	1 209	501	473	661	173	3 017

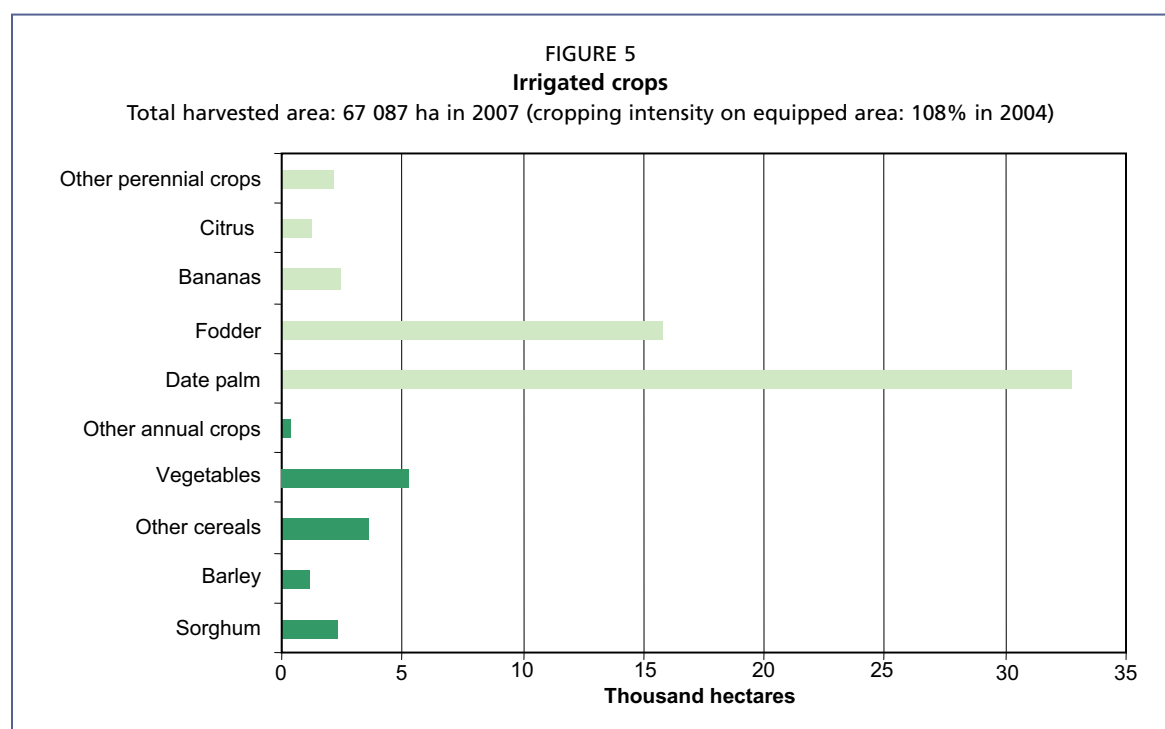
Role of irrigation in agricultural production, economy and society

In 2007, the total harvested area was 67 087 ha of which 81 percent were permanent crops (Table 3 and Figure 5). Date palms covered almost 50 percent of the harvested area, fodder 24 percent and cereals 11 percent. There are more than 8 million date palms in Oman, distributed along the coast of Batinah and the oases in different regions. Total date production in 2007 was estimated at 255 870 tonnes whereas fodder production was around 610 300 tonnes. In 2004, the harvested area was estimated at 63 606 ha of which 33 050 ha were located in the Al Batinah area.

The average cost of installing sprinkler and localized irrigation systems is estimated at US\$4 300/ha for large and medium schemes and US\$6 144/ha for small schemes, meaning an increase of 32 and 39 percent respectively compared to 1996. The combined capital, maintenance and energy cost of pumping groundwater from a typical dug well for traditional irrigation is estimated at about US\$0.021/m³ for average conditions. Pumping costs from a tubewell for a modern irrigation system, requiring a larger pumping head, are between US\$0.031 and 0.039/m³.

The amount of water used for irrigation depends on the type of crop and the cropping system adopted, as well as on the climate of the regions. It varies from 16 700 to 20 800 m³/ha per year depending on the regions and from 4 000 to 27 400 m³/ha per year according to the type of crops. The net return on water from agriculture is generally marginal in northern Oman. In Salalah returns are much better because crop water requirements are lower and higher value crops are grown, such as bananas and coconuts.

Only men are involved in agricultural water management. Women are involved in product harvesting and processing as well as taking care of the animals.



Status and evolution of drainage systems

A study carried out in 1994 on the salinity of soils in general in Oman states that an area of 11.7 million ha, which is 38 percent of the total area of Oman, is affected by salinity. Agricultural water withdrawal has resulted in a decline of groundwater levels and falaj flows in most regions. It has also caused an increase in the average salinity of water used in agriculture. For more than 10 years saline water intrusion in coastal areas has been occurring so much that productive farms are being abandoned. No drainage is practiced.

WATER MANAGEMENT, POLICIES AND LEGISLATION RELATED TO WATER USE IN AGRICULTURE

Institutions

Until May 2001, the Ministry of Water Resources (MWR) was in charge of water resources assessment, whereas the Ministry of Agriculture and Fisheries (MAF) was in charge of irrigation. However, in May 2001, the MWR was abolished and its activities were transferred to the Ministry of Regional Municipalities and Environment and Water Resources (MRMEWR).

Water management

Three broadly-based programmes have been set up by the government related to: (i) the improvement of data collection; (ii) a detailed assessment of the water resources; (iii) a study of water demand and its spatial distribution. The government also has plans to relocate some of the large-scale farms in the Batinah and Salalah Plains, where the water resources are overutilized, to areas with underutilized water resources. Several water conservation initiatives have been developed, such as leakage control in municipal water supply schemes and the improvement of irrigation methods through subsidy programmes. Public awareness of water resource issues has created a general and focused understanding of the overall situation and of the specific contribution each citizen can make.

A number of national priorities and strategies related to water resources development have been developed including the following:

- achieve optimum utilization of available natural resources
- continue the exploration for water resources
- continue the construction of recharge dams and other hydrological structures
- maximize agricultural productivity within the natural limitations of climate and water resources availability and sustainability
- conserve water for the agricultural sector through: (i) moving high water consuming crops to brackish water areas; (ii) limiting cultivation of perennial grasses and high water consuming crops; (iii) promoting seasonal crops and limiting perennial cultivation; (iv) promoting modern irrigation techniques; (v) promoting the use of brackish water for agricultural use;
- extend wastewater collection measures and promote wastewater reuse
- increase the use of desalinated water for domestic purposes
- protect the groundwater resources in qualitative as well as quantitative terms
- control saline water intrusion by reducing abstraction to below the long-term recharge rate
- expand monitoring of water use

Policies and legislation

With Oman having entered the arena of recent developments in 1970 and with the increasing demand for water, legislation was prepared to safeguard interests with regard to the rights established by customs and traditions. Many plans and programmes were set up to increase the efficiency of water use.

In 1988, Royal Decree No. 83/88 declared the water resources of Oman to be a national resource. This is the most far-reaching and important piece of legislation on water resources. Oman has several laws on water resources and the main measures taken for water management and conservation are:

- no wells may be constructed within 3.5 km of the mother well/source of the falaj
- permits are required for the construction of new wells, for deepening existing wells, for changes in use and for installing a pump
- all drilling and well digging contractors are required to register with the Ministry of Regional Municipalities, Environment and Water Resources (MRMEWR) on a yearly basis
- the MRMEWR has the cooperation of other government agencies such as the Ministry of the Interior and the Royal Oman Police in dealing with offenders
- no extension of existing agriculture lands and no cultivation of new lands are allowed

Royal Decree No 72/89 was issued for the application of modern irrigation systems in the Batinah region with the intention of rationalizing water use, increasing agricultural production and improving its quality. As an incentive to the farmers to introduce the systems the Government provided a financial subsidy to alleviate the cost burden.

In 2000, a new Royal Decree, No 29/2000, defined water as a national asset to be protected and regulated activities related to wells and aflaj and the use of wells for desalination.

In 2001, Royal Decree No 114/2001 on conservation of the environment and prevention of pollution regulated the disposal of solid and hazardous waste, pollution control and the issuing of permits for discharging untreated wastewater (MRMEWR, 2005).

ENVIRONMENT AND HEALTH

The quality of the water in the wells differs from place to place. In places near the sea the Electric Conductivity (EC) may reach 10 dS/m, owing to the pumping of groundwater at rates higher than the secured discharges leading to saline sea water intrusion into the agricultural lands. In most of the coastal area salinity has increased gradually since 1988 when the expansion of agriculture reached its peak. The south Batinah areas in particular have suffered from a progressive salinity increase over the last decade owing to the wide expansion of agriculture while other areas showed a gradual increase. 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 where, as in most of the Sultanate, groundwater is unconfined and most soils are sandy loam with low organic content (low water-holding capacity and high deep-percolation). The government is strict about the use of all types of agrochemicals. Since 1973, over 50 separate pieces of environmental legislation have been enacted in connection with various aspects of the environment, covering topics ranging from the protection of fish, flora and fauna, to waste disposal and quality standards for drinking water and the reuse of treated sewage effluent.

PROSPECTS FOR AGRICULTURAL WATER MANAGEMENT

A National Water Resources Master Plan was prepared in 2000 to establish a strategy and plan for the period 2001-2020 for the sustainable development, management and conservation of water resources in the Sultanate of Oman. The Plan was based on general and resource studies, economic studies and some limited social studies as well as institutional and implementation support studies. The technical basis for the Plan comprises the assessments of water availability, development potential and demand for water.

In general terms, it was concluded that there is a requirement for an additional supply and/or adjustment of water use to yield overall about 330 million m³/year in order to meet future additional priority demands and restore the existing deficit during the Master Plan period. In view of the current high levels of water consumption by farmers using wells, demand management and water quality conservation measures were investigated in order to determine how consumption could be reduced to sustainable levels and the implications of such measures were evaluated. Some of these measures would need the support of a legislative, regulatory or institutional nature delivered at a national or regional level (Ministry of Regional Municipalities, Environment and Water Resources, 2005).

With the aim of increasing irrigation efficiency, the government committed itself to encouraging the introduction of localized irrigation systems. The introduction of these systems is considered to be one of the most important projects implemented by the Ministry of Agriculture and Fisheries (MAF) to conserve water and achieve agricultural development. The MAF has set the standard specifications and the technical terms for the implementation of modern irrigation systems, as well as for the calculation of crop water requirement for different areas. According to the agricultural census 2004-2005, 19 percent of the harvested area was under modern irrigation: 52 percent of harvested vegetables area was under modern irrigation, 42 percent of fodder but only 9 percent of field crops and 6 percent of dates and other fruits.

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