Journal of Economic Cooperation **27**, 1 (2006) 39-70

WATER RESOURCES AND AGRICULTURAL DEVELOPMENT IN THE ESCWA AND OTHER OIC MEMBER COUNTRIES

Bahar Bayraktar*

The scarcity of water, which puts great pressure on agricultural production, acts as an important obstacle to economic and social development. Since the majority of the ESCWA and other OIC countries are located in the world's most arid region, they face severe challenges in meeting the rapidly growing demand for water. In this context, this paper sheds light on the state of water resources and their use in agriculture in the ESCWA and other OIC countries by examining the performance of those countries in terms of water use in agriculture. It highlights the fact that using the adequate quality and appropriate quantity of water lies at the heart of sustainable agricultural development in those countries.

1. INTRODUCTION

Agriculture is widely believed to be the primary economic activity and is assumed to play the major role in the economies of most developing countries**,** including OIC members. It is the principal sector in terms of national income, employment and exports. Most importantly, it is the main source of food security for the whole world. However, constraints on natural resources along with the increasing population have made it hard to achieve sustainable agricultural development and food security. In particular, the physical limitation on land and water resources is an important obstacle to food and agricultural production.

Prudent use of water, particularly in agriculture, is an immediate necessity to meet the basic needs of the increasing population. In this context, water resource management has gained an important ground in almost all countries to deal with the growing demand for water, especially in agriculture. Actually, the efficient use of scarce water resources lies at the heart of the world's agenda since the 1st

* Economist, Research Assistant at the SESRTCIC.

International Conference on Water (Mar de la Plata, 1977) which was followed by the International Conference on Water and Environment (Dublin, 1992), the 1st World Water Forum (Marrakech, 1997) and the 2nd World Water Forum in The Hague, 2000.

As the agriculture sector is the most important and largest water consumer, priority has been given to the efficient use of water in agriculture and building up water management strategies in many countries, particularly those in arid regions. In this context, irrigation technology has an important impact on the amount of water used in agricultural production where water devoted to irrigation needs to be effectively utilised to derive the maximum benefit and prevent wastage. Increased agricultural production due to optimal water use in irrigation systems makes an important contribution to nutrition, food security and economic growth.

Due to the crucial role of agricultural development in the overall development process, the scarcity of water, which puts a great pressure on agricultural production, acts as an important obstacle to economic and social development in the ESCWA and most OIC countries. Since the majority of those countries are located in the world's most arid regions, the ESCWA and other OIC countries face severe challenges in meeting the rapidly growing demand for water. To satisfy the basic food needs of their increasing population, those countries have to use their scarce water resources effectively.

This paper sheds light on the state of water resources and their use in agriculture in the ESCWA and other OIC countries. This is done through examining the performance of those countries in terms of water use in agriculture, with a special emphasis on irrigation. The paper relies mainly on the FAO's FAOSTAT and AQUASTAT databases.

2. WATER RESOURCES AND THEIR USE IN AGRICULTURE

Both an adequate quality and an appropriate quantity of water are required to satisfy food demand for a growing population. Actually, according to FAO (2003), with a world population of 6 billion, the water needed to produce the necessary food is 6 000 km^3. In particular, to produce 1 kg of wheat, 1 kg of rice and 1 kg of beaf, $1m^3$, 1.2 m^3 and 13 m^3 of water respectively are needed. On the other hand, while the

daily drinking water requirement per person is 2-4 litres, to produce a person's daily food, 2000-5000 litres of water are required.

As the bulk of global food production is dependent upon a whole range of agricultural systems in which water is a critical factor of production (FAO/WB, 2001), all countries put special emphasis on the efficient and productive use of scarce water resources. One should also be aware of the reasons behind water scarcity prior to building up water management strategies. In this context, Tuijl (1993) states that water scarcity can occur for many reasons:

- Current usage reaches the physical limits of available water resources,
- Physical conditions make it increasingly difficult and costly to balance supply and demand,
- Pollution and environmental degradation cause the loss of useable and affordable water resources.

In this context, as water is a scarce commodity in many countries, including the ESCWA and other OIC members, this section focuses on the water resources of those countries and displays the distribution of water resources among them.

2.1. Renewable Water Resources

Table 1 presents figures on the average annual precipitation[1] and annual internal renewable water resources[2]. While the ESCWA countries receive only 0.4 per cent of the world's average annual precipitation, the other OIC countries receive 16.5 per cent of it. In addition, the ESCWA countries' share in the world's annual internal renewable water resources is limited to 0.1 per cent. However, the same ratio is 14 per cent for the other OIC countries.

[1] Average precipitation is the double average over space and time of the precipitation (i.e. water falling) on a country in a year (rain, snow or hail).
[2] Internal renewable water resources are the average annual flow of rivers and groundwater generated from endogenous precipitation.

The OIC countries' annual internal renewable water resources account for 33.5 per cent of their average annual precipitation while that share is 12.1 per cent for the ESCWA countries. Water scarcity can also be measured by the per capita renewable water resources. The ESCWA countries have very limited water resources, with per capita 137.5 m^3/year, which is less than that of the OIC countries (4499 m^3/year) and the world (7243 m^3/year). Particularly, Kuwait and Bahrain have the lowest per capita annual internal renewable water resources, namely 0 m^3/year and 6 m^3/year, respectively (See Table A.1 in the Annex). Furthermore, the 4499 m^3/year total renewable water resources per capita of the OIC countries are still lower than those of the world. Briefly, the figures in Table 1 indicate that the ESCWA and other OIC countries have very limited internal water resources.

Table 1: Distribution of Renewable Water Resources

	Average Precipitation (million m^3/yr)	**Annual Internal Renewable Water Resources**		
		(million m^3/yr)	As of Precipitation	Per capita m^3/yr
ESCWA	472433	57216	12.1	137.5
Other OIC Countries	17783640	6066750	34.1	5091.7
OIC Countries	18256073	6123966	33.5	4499.4
World	107924000	43764000	40.6	7243.0
As % of world				
ESCWA	0.4	0.1		
Other OIC Countries	16.5	13.9		
OIC Countries	16.9	14.0		

Source: Table A.1 in the Annex.

Table A.2 in the Annex presents figures on total renewable water resources in the ESCWA and other OIC countries. The total actual renewable water resources are composed of internal water resources and incoming water flows originating outside the country. The figures on the total actual renewable water resources reveal that the ESCWA and other OIC countries are still among the poorest in the world in terms of water resources. While the per capita total renewable water resources are 611 m^3/year in the ESCWA countries, they are 5834 m^3/year in the OIC countries.

Moreover, some OIC countries, including the ESCWA members, depend to a large extent for their renewable water resources on water flows originating outside their borders. Out of the 57 OIC countries, 18 have a dependency ratio[3] of more than 50 per cent and four, namely, Bangladesh, Mauritania, Niger and Turkmenistan, have a dependency ratio of at least 90 per cent. On the other hand, among the ESCWA countries, Kuwait, Bahrain and Egypt record the highest water resources dependency ratio of 100 per cent, 96.5 per cent and 96.9 per cent, respectively (See Table A.2 in the Annex). Only four out of the 13 ESCWA countries do not depend on water resources originating outside their borders.

2.2. Water Use in Agriculture

Although the total water withdrawal of the world is 3240 billion m^3, most of that water is lost before it reaches the plant root zone due to channel leakage, spillage, seepage and evaporation (AQUASTAT). The remaining water supply is allocated between domestic, agricultural and industrial needs. Table 2 provides data on the total, agricultural, domestic and industrial water withdrawal of the ESCWA and OIC countries.

It indicates that the total water withdrawal of the OIC countries is 891.2 billion m^3**,** which constitutes 27.5 per cent of the world total compared to 5 per cent for the ESCWA countries. While 89.8 per cent of the ESCWA countries' total water withdrawal is devoted to agricultural use, that share is 90.6 per cent in the OIC countries. More than 90 per cent of the withdrawn water is directed towards agriculture in Iraq, Oman, Syria and Yemen. While Kuwait and Bahrain have the lowest agricultural withdrawals, 52 and 57 per cent respectively, Syria has the highest percentage (95 per cent) among the ESCWA countries. Although agriculture is the largest consumer of water resources, one should be aware of the domestic and industrial uses of water to effectively allocate the water resources between the sectors. In the OIC countries, 5.6 per cent of the water withdrawal is directed to domestic use while 4.5 per cent is devoted to industrial use. According to the figures in Table 2, the total water withdrawal directed towards domestic (6.7 per cent) and industrial (7.7 per cent) uses in the ESCWA countries is higher than the OIC and world averages.

[3] Dependency ratio is the part of the global renewable water resources which originates outside the country.

Table 2: Water Withdrawal by Sector

	Total Water Withdrawal (million m^3/yr)	**Agricultural Water Withdrawal** (million m^3/yr)	**Domestic Water Withdrawal** (million m^3/yr)	**Industrial Water Withdrawal** (million m^3/yr)
ESCWA	162330	145830	10890	12450
Other OIC Countries	728877	661946	38833	28098
OIC Countries	891207	807776	49723	40548
World	3240000	2235600	259200	745200
	As % of world	**As % of total withdrawal**		
ESCWA	5.0	89.8	6.7	7.7
Other OIC Countries	22.5	90.8	5.3	3.9
OIC Countries	27.5	90.6	5.6	4.5
World		93.0	5.0	2.0

Source: Table A.3 in the Annex.

Notes:

Total water withdrawal is the annual quantity of water withdrawn for agricultural, industrial and domestic purposes. This excludes all other sectors such as energy, mining, recreation, navigation, fisheries and the environment. Those sectors are usually characterised by a very low consumption rate.

Agricultural water withdrawal is the annual quantity of water withdrawn for agricultural purposes. It includes irrigation and livestock watering.

Domestic water withdrawal is the annual quantity of water withdrawn for domestic purposes. It is usually computed as the total water withdrawn by public distribution networks, and usually includes the withdrawal of those industries connected to public networks.

Industrial water withdrawal refers to self-supplied industries not connected to any distribution network.

In sum, according to the figures on renewable water resources, it is clear that water is a scarce commodity in the ESCWA and other OIC countries. In fact, the distribution of the total water withdrawal among the sectors indicates that the agriculture sector is the basic water consumer in the ESCWA members and in other OIC countries.

2.3. Irrigation

Since irrigation plays a vital role in meeting the demand for food in many countries, huge amounts of water are devoted to it. Actually, the irrigated potential of countries depends on the availability of water.

According to the FAO (2003), irrigation accounts for two thirds of water use worldwide and almost 90 per cent in many developing countries. In addition, Foster et al. (2000) state that about 40 per cent of the world's food is grown in irrigated soils, which makes up 18 per cent of the global crop land. However, improving irrigation efficiency is a slow and difficult process in the water-scarce countries. On the other hand, increasing competition and the rising water demand by the industrial and domestic sectors lead to a decrease in the water allocated to irrigation (FAO, 2003).

2.3.1. Irrigation Area

The term irrigation area refers to the area of land equipped to provide water for crops. It includes areas equipped for full and partial control irrigation[4], spate irrigation areas[5] and equipped wetland and inland valley bottoms[6]. It does not include flood recession cropping areas[7].

Table 3 indicates that the total irrigation area in the OIC countries covers 68 million hectares or 25 per cent of that of the world. As for the ESCWA countries, the total irrigation area covers 11 million hectares or 4 per cent of that of the world. The bulk of the total irrigation area of the ESCWA countries is concentrated in 4 countries (Egypt, Iraq, Saudi Arabia and Syria). While full or partial irrigation covers 70 per cent of the total irrigation area in the OIC countries, it is the most widespread type of irrigation, covering 99 per cent of the total irrigation area, in the ESCWA countries (calculated using the figures in Table A.4 in the Annex).

---

[4] Physical area of irrigation schemes developed and managed either by the government, private estates or farmers and where a full or partial control of the water is achieved; gardening is included.

[5] It is a method of random irrigation using the floodwaters of a normally dry system. It is practised by building earthen diversion banks across a dry watercourse. The floods or spates are diverted into embanked fields where water is pounded until total infiltration.

[6] Parts of cultivated wetlands and inland valley bottoms which have been equipped with water control structures such as intakes, canals, etc.

[7] Areas along rivers where cultivation occurs in the areas exposed as floods recede. The special case of floating rice is included in this category.

Table 3: Total Irrigation Area and Water Managed Area
(000 hectares)

	Total Irrigation Area	f/p Control (1)	Spate (2)	Equip. Wet/ivb (3)	Flood Recession Cropping	Water Managed Area
ESCWA	10869	10788	103	0	0	10891
Other OIC Countries	57408	37006	1512	4103	1019	44284
OIC Countries	68277	47794	1615	4103	1019	55175
World	276719				27757	304476
As % of World						
ESCWA Countries	**3.9**				**0**	**3.5**
Other OIC Countries	**20.7**				**3.7**	**14.5**
OIC Countries	**24.7**				**3.6**	**18.1**

Source: Table A.4 in the Annex.
Notes: (1) Full/Partial (f/p) control irrigation equipped area.
(2) Spate irrigation area.
(3) Equipped wetland and inland valley bottoms.

While spate irrigation is important in the other OIC countries, it is negligible in the ESCWA countries (Table A.4). Besides, equipped wetland and inland valley bottoms and flood recession cropping are not reported in any of the ESCWA countries. In contrast, they cover 4.1 and 1.0 million hectares respectively in the other OIC countries. On the other hand, the water managed area covers 11 and 44 million hectares in the ESCWA members and the other OIC countries, respectively. Table 3 also indicates that the water managed area in the OIC countries accounts for 18 per cent of that of the world.

Table 4: Total Irrigation Area as % of the Total Land, Agricultural and Arable Areas

	Total Irrigation Area as % of		
	Total Land Area	**Agricultural Area**	**Arable Area**
ESCWA	2.2	4.7	56.4
Other OIC Countries	3.1	7.3	34.4
OIC Countries	3.0	6.9	35.9
World	3.3	6.8	19.7

Source: Table A.5 in the Annex.

The shares of the irrigation area in the land, agricultural and arable areas are presented in Table 4, which is a summary of Table A.5 in the

Annex. The total irrigation area in the OIC countries forms 3.0 per cent of their total land area and 6.9 per cent of their agricultural area, which are approximately closer to the world figures. The irrigation area covers 35.9 per cent of the arable land in the OIC countries compared to 19.7 per cent for the whole world. As for the ESCWA countries, the total irrigation area accounts for 2.2 per cent of the total land area and 4.7 per cent of the agricultural area. It also covers more than half of the arable land in the ESCWA countries. That is, the largest part of the arable land is devoted to irrigation in the ESCWA countries. However, in some countries such as Egypt, the whole agricultural land area is under irrigation (See Table A.5 in the Annex). The total irrigation area exceeds the arable land in Bahrain, Egypt, Oman, Kuwait and the U.A.E.

2.3.2. Sources of Irrigation Water

There are three possible sources of irrigation water: surface water, groundwater (renewable or fossil) and non-conventional sources (treated wastewater and desalinated water)[8]. Table A.6 in the Annex presents the sources of irrigation water for the full or partial control irrigation equipped areas. Among the ESCWA countries, Bahrain, Qatar, Saudi Arabia, the U.A.E. and Yemen rely extensively on groundwater as a source of irrigation, while the irrigation water of Egypt and Iraq consists mainly of surface water. The contribution of surface water is the most important in the majority of the OIC countries. Actually, spate irrigation and flood recession cropping areas are all irrigated by surface water[9].

2.3.3. Irrigation Techniques

Data on the irrigation techniques used in full or partial (f/p) irrigation schemes are fully available for 41 countries. Based on Table A.7 in the Annex, surface irrigation is by far the most widely used technique in the ESCWA and other OIC countries. In Libya and Saudi Arabia, sprinkler

[8] Percentage of area irrigated from groundwater is the part of the full or partial control area irrigated from wells (shallow wells and deep tubewells).
Percentage of area irrigated from surface water is the part of the full or partial control area irrigated from rivers or lakes (reservoirs, pumping or diversion).

[9] It is a method of irrigation where the water is applied to the land (from rivers and lakes) by allowing it to flow by simple gravity, before infiltrating. It includes various systems depending on the relative magnitude of the surface flooding phase and the infiltrating phase after accumulation: furrow, border, basin and flooded irrigation of rice.

irrigation[10] is the most dominant (100 and 64 per cent, respectively), while in Jordan and the U.A.E., micro irrigation[11] is the most widely used technique.

2.3.4. Irrigation Intensity and Irrigation Potential

The rate of use of land equipped for irrigation[12] and the cropping intensity[13] are the most frequently used indicators to assess irrigation intensity. In general, these figures are not reliable at the country level (see Table A.8 in the Annex). Actually, in some cases, it is hard to distinguish between these two indicators since one part of the equipped area is not used for certain reasons (abandoned, water shortage, etc.), while the remaining part is cultivated in double or triple cropping. In addition, figures may vary from one year to another, particularly in the area where irrigation schemes are facing water availability problems.

The data are limited for the irrigated crops area and cropping intensity ratio in almost all the OIC countries. The rate of use of the equipped area is greater than 50 per cent in the OIC countries (excluding Benin and Mozambique) and in 13 countries (5 of which are ESCWA members), is reported to be 100 per cent. Furthermore, according to the available figures in Table A.8, the cropping ratio is 1.66 in Egypt, 1.19 in Syria and Mauritania, 1.15 in Oman and 1.08 in Jordan. In addition, cropping intensity is reported as 1 in Bahrain, Kuwait, Lebanon and Saudi Arabia, due in part to the fact that no cropping is possible during the hot season. Among the ESCWA countries, Egypt and Iraq have the highest irrigation potential (see Table A.8 in the Annex).

---

[10] It is a method of irrigation by applying water under pressure where the water is sprinkled in the form of artificial rain through lines carrying distribution components: rotary sprinklers, diffusers with permanent water streams and perforated pipes.

[11] It is a method of irrigation (with different techniques) by which water is applied to and causes the wetting of only a part of the soil in the field at the base of the plant (plant root zone) in small but frequent quantities, i.e. drop by drop. It includes the following terms or systems: trickle irrigation, drip irrigation, daily flow irrigation, drop irrigation and sip irrigation.

[12] It is the part of the area equipped for full or partial (f/p) control irrigation actually irrigated and used for crop production at least once a year.

[13] It is the ratio between irrigated crops area and the physical area equipped for irrigation (i.e. the water managed area).

According to the figures introduced by Tables A.4 and A.8 in the Annex, huge amounts of land and water are devoted to irrigation in the ESCWA and other OIC countries. Thus, the effective use of water in irrigation has a significant impact on the main water saving strategies.

3. AGRICULTURE AND FOOD INSECURITY

Agriculture plays a crucial role in the sustained economic growth, eradication of poverty and food security. Evaluating the situation of agriculture and food insecurity and understanding the main barriers to sustainable agricultural development and food security lie therefore at the heart of the overall development process. In this context, this section evaluates the state of agriculture and food insecurity in the ESCWA and other OIC countries.

3.1. Population and Agricultural Land

According to the figures in Table 1, the agricultural population accounted for 26 per cent of the total population in the ESCWA countries in 2004. In the same year, that population in the other OIC countries constituted 44 per cent of the total population, a rate higher than that of the world average. In the developing countries, the share of agricultural population was 46 per cent in 2004 (Table 5).

Table 5: Population in Agriculture

	Population in Agriculture (2004)	
	(million)	% of total
ESCWA	**41**	**26**
Other OIC	**520**	**44**
OIC	**561**	**42**
World	**2680**	**42**
Developing Countries	**2474**	**46**

Source: Table A.9 in the Annex.

Efforts toward achieving effective and productive use of land in agriculture have a vital role in the process of agricultural development. In particular, the degradation of land resources, loss of agricultural land and lack of arable land have made it difficult to meet the growing demand for food. According to the FAO estimations in 1995, 5 to 7

million hectares of farming land are lost each year due to land degradation and urbanisation which leads to a fall in agricultural yields (FAO, 1995).

Table 6 summarises the data given in Table A.10 in the Annex and shows the shares of the ESCWA and other OIC countries in the world and the developing countries' total. The 57 OIC member countries cover a total land area of 3176.8 million hectares, or about 24.3 per cent of the total land area of the world and 41.8 per cent of that of the developing countries. The ESCWA countries cover 482.2 million hectares or 3.7 per cent of the total land area of the world and 6.3 per cent of that of the developing countries.

Out of their total land area, the OIC countries have an agricultural land area of 1364 million hectares or 27.2 per cent of the total agricultural land area of the world and 42.8 per cent of that of the developing countries. As for the ESCWA countries, the agricultural land accounts for 46.1 per cent of their total land area, a ratio higher than that of the OIC countries (42.9 per cent), the developing countries (41.9 per cent) and the world (38.4 per cent). This is due to the fact that the pastures land area forms 90 per cent of the total agricultural land area in the ESCWA countries. Actually, for the other OIC countries, the picture is the same, that is the bulk of the agricultural area is permanent pasture land used for the grazing of livestock.

On the other hand, the arable land in the OIC and ESCWA countries covers an area of 261.3 and 18.5 million hectares, respectively. While the arable land area of the OIC countries accounts for 8.2 per cent of their total land area, that rate is only 3.8 for the ESCWA countries, both being less than those of the world and the developing countries. The permanent crops land in the OIC countries covers an area of 45.1 million hectares. In the ESCWA countries, that area covers 2.5 million hectares, equivalent to 1.9 per cent of the total permanent crops area of the world and 2.4 per cent of that of the developing countries.

As shown in Table 6, the share of agricultural land in the total land area in the OIC countries is higher than that of the developing countries and the world. In addition, despite the fact that the ESCWA countries have the highest share of agricultural land in the total land area among

the OIC countries, the developing countries and the world, they have the smallest arable and permanent crops land areas. This is in part a result of the ineffective use of agricultural land due to the scarce water resources. But also due to the fact that most of their agricultural land is pasture areas, the agricultural land area seems to be large.

Table 6: Land Used in Agriculture
(million hectares)

	Total Land Area	Agricultural Land	Arable Land	Permanent Crops Land	Permanent Pasture
ESCWA	482.2	222.5	18.5	2.5	200.8
Other OIC Countries	2694.6	1141.6	242.8	42.6	852.3
OIC Countries	3176.8	1364.2	261.3	45.1	1053.1
As % of world					
ESCWA	3.7	4.4	1.3	1.9	5.8
Other OIC Countries	20.6	22.8	17.3	31.2	24.5
OIC Countries	24.3	27.2	18.6	33.0	30.3
As % of developing countries					
ESCWA	6.3	7.0	2.3	2.4	8.8
Other OIC Countries	35.4	35.8	30.6	40.0	37.3
OIC Countries	41.8	42.8	33.0	42.4	46.0
As % of land area					
ESCWA	100.0	46.1	3.8	0.5	41.6
Other OIC Countries	100.0	42.4	9.0	1.5	31.6
OIC Countries	100.0	42.9	8.2	1.4	33.1
World	100.0	38.4	10.7	1.0	26.5
Developing Countries	100.0	41.9	10.4	1.4	30.0

Source: Table A.10 in the Annex.

Notes:

Land area refers to the total area excluding that under inland water bodies such as rivers and lakes.

Agricultural land refers to the total of arable land, permanent crops land and permanent pastures.

Arable land refers to land under temporary crops (double cropped areas counted only once), temporary meadows for mowing or pasture, land under market and kitchen gardens, and land temporarily fallow (less than five years).

Permanent crops refers to land cultivated with crops that occupy the land for long periods and need not be replanted after each harvest, such as cocoa, coffee and rubber. It includes land under shrubs, fruit trees, nut trees and vines, but excludes land under trees grown for wood or timber.

Permanent pasture refers to land used permanently for herbaceous forage crops, either cultivated or growing wild.

3.2. Agricultural Production and Food Security

The role of agriculture in the economy changes from one country to another. While it plays, on average, a limited role in the ESCWA countries with its 8 per cent share in GDP, it accounts for 17 per cent of the GDP in the other OIC countries (Table 7).

Agricultural production, especially per capita, is an important indicator of a country's agricultural performance and state of food security. Therefore, it is useful to examine the per capita agricultural production in the ESCWA and other OIC member countries. As shown in Table A.11 in the Annex, out of 52 OIC member countries, 23 have higher per capita agricultural production than that of the world. However, only 4 ESCWA countries out of 12 have per capita agricultural production higher than the world average.

Table 7: Agricultural Production

	Share of agriculture in GDP (%)*	**Agricultural Production** (000 tons)		
		Cereals	**Fruit and Vegetables**	**Meat**
		2003	**2003**	**2003**
ESCWA	**8**	28642	35545	3343
Other OIC Countries	**17**	281277	163733	15285
OIC Countries	**14**	309919	199278	18628
World		2075309	1322454	253528
As % of World				
ESCWA		1.4	2.7	1.3
Other OIC Countries		13.6	12.4	6.0
OIC Countries		14.9	15.1	7.3

Source: Table A.11 in the Annex.

It can be seen from Table 7 that the OIC countries' cereal production (309.9 million tons) accounts for 15 per cent of the world's total cereal production, while that of the ESCWA countries (28.6 million tons) accounts for only 1.4 per cent of that total. Cereals are one of the most important food consumption items as measured in calories. Thus, an increase in the cereal production contributes to eradicating food insecurity. Cereal production is concentrated in some countries, namely Egypt, Bangladesh, Indonesia, Iran, Nigeria, Pakistan and Turkey. Excluding Egypt, the ESCWA countries are poor in the production of

cereals. The production of fruit and vegetables in the OIC countries (199.2 million tons) accounts for 15.1 per cent of the world's total fruit and vegetable production, while the ESCWA countries (35.5 million tons) produce only 2.7 per cent of the world's total. In addition, the ESCWA countries' share in the world's total meat production (1.3 per cent) is limited compared to the OIC countries which account for 7.3 per cent of that total.

Since agricultural production is not enough to meet the increasing demand for food, many countries rely on agricultural imports. In 2002, the share of the OIC and ESCWA countries in world agricultural imports was 10.8 per cent and 4.1 per cent, respectively (Table 8). In addition, the OIC countries had a share of 7.6 per cent in the world agricultural exports, while the ESCWA countries' share was 1.2 per cent in 2002. In absolute terms, the total agricultural imports and exports of the OIC countries were $50.1 billion and $33.6 billion, respectively. While the gap between agricultural imports and exports was $13.9 billion in the ESCWA countries, it was $16.4 billion in the OIC countries (Table 8).

Table 8: Agricultural Imports and Exports (million $)

	Agricultural Imports	**Agricultural Exports**
	2002	**2002**
ESCWA	19031	5116
Other OIC Countries	31135	28564
OIC Countries	50166	33680
World	464034	442057
As % of world		
ESCWA	4.1	1.2
Other OIC Countries	6.7	6.5
OIC Countries	10.8	7.6

Source: Table A.12 in the Annex.

The figures in Table 8 indicate that agricultural imports have an important role in the total imports of the ESCWA and other OIC countries. In 2002, out of 52 OIC countries for which the data are available, the share of agricultural imports of 46 countries in the total imports was more than that of the world (7 per cent). Particularly, the ESCWA countries, excluding the U.A.E, had a share of agricultural imports in total imports higher than that of the world. In the majority of

the ESCWA and OIC countries, the share of food in agricultural imports was around 80 per cent. In contrast, the share of agricultural exports in total exports was very low (around 1 per cent) in the ESCWA countries, excluding Egypt, Jordan, Lebanon, Palestine, Oman and Syria. In 2002, half of the ESCWA countries for which the data are available had a share of food in agricultural exports lower than that of the world. This raises the gap between food exports and imports.

In short, almost all of the OIC and ESCWA countries are net importers of agricultural commodities. While the share of food imports in the total agricultural imports is definitely high in those countries, the share of food exports in total agricultural exports is negligible. In this context, melting the gap between food exports and imports and achieving a self-sufficient production of food requires an efficient and productive use of scarce resources, especially water.

Food security is defined by the FAO as physical, social and economic access for all people to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food insecurity arises when people live with hunger and fear of starvation (FAO, 2003). One of the reasons behind food insecurity is the lack of water resources which deteriorates food production. In this context, the efficient use of water resources is the most vital need to increase food production and alleviate undernourishment.

Table A.13 in the Annex provides data on the prevalence of undernourishment in the ESCWA and other OIC countries. In absolute terms, there were 11.1 million undernourished people in seven ESCWA countries for which the data are available during the period 2000-2002. Among the ESCWA countries, Yemen had 6.7 million undernourished people, which constituted 36 per cent of the total population. During the said period, there were 178.9 million undernourished people in the OIC countries, which represents 22 per cent of the total undernourished people in the developing world. The OIC countries include the most food-insecure countries. The same table indicates that the proportion of undernourished people was still around 50 per cent or more in Mozambique, Sierra Leone and Tajikistan. Actually, decreasing the number of undernourished people is one of the main goals of the Millennium Development Goals. However, according to those figures, for some OIC countries, it is very hard to reach this goal by the year 2015.

In the light of the above discussion, although it is clear that agricultural activity plays a crucial role in most of the OIC economies, domestic agricultural production is not enough to meet the demand for food. In fact, the majority of the ESCWA and other OIC countries are extensively dependent on food imports.

4. CONCLUSION

It is widely believed that agriculture plays a vital role in most of the developing economies, including the OIC countries. Actually, agricultural land covers 43 per cent of the total land in the OIC countries and 46 per cent in the ESCWA countries. As the agricultural population accounts for 42 per cent of the total population in the OIC countries, agriculture has an indispensable role in job and income generation. However, agricultural production is seriously disturbed by the limited and inefficient use of national resources.

Available information on land and water databases indicates that scarce water resources and their ineffective use put an important pressure on agricultural and food production in the ESCWA and OIC countries. Actually, agricultural production in those countries is not comparable to that of the world. In this context, to meet the increasing demand for food, countries are becoming more dependent on food or agricultural imports. On the other hand, the limited food production due to the constraints on natural resources, such as land degradation and water scarcity, increases the number of undernourished and food-insecure people.

Receiving only 3.6 per cent of the world's precipitation and having as little as 2.2 per cent of its renewable water resources, the ESCWA and other OIC countries are poor in terms of water resources. Figures on per capita renewable water resources reveal that water shortages are of great concern to those countries. Moreover, the majority of those countries depend on water flows originating outside their borders-dependency ratio reaching more than 80 per cent. In addition, more than 90 per cent of the total water withdrawal in the ESCWA and other OIC countries is diverted to agriculture.

As agriculture is the dominant user of water, the main strategies of water management rely on the efficient use of water in agriculture. In

this context, the efficient use of land and water in irrigation and improving irrigation systems have a critical role in sustainable food production and agricultural development.

To sum up, using the adequate quality and appropriate quantity of water lies at the heart of sustainable agricultural development and alleviating food insecurity. In this respect, to provide prudent use of water, a number of management strategies arise that focus on two main issues: increasing the efficient use of agricultural water and reducing wastage. In addition, adequate institutions are required to meter and control water use. Strong enforcement and management policies also need to be implemented to reduce water losses and attain the optimal use of water.

REFERENCES

FAO Database (FAOSTAT). http://www.fao.org/faostat.

FAO 1995, "Dimensions of Need: An Atlas of Food and Agriculture", FAO, Rome, 1995,

FAO's Information System on Water and Agriculture (AQUASTAT). http://www.fao.org/aquastat.

FAO 2003, "Review of World Water Resources by Country", Water Reports: 23, FAO, Rome 2004.

FAO 2004, "FAO Statistical Yearbook", FAO, Rome 2004.

Tuijl, W. V. (1993), "Improving Water Use in Agriculture: Experience in the Middle East and North Africa", World Bank Technical Paper number 201.

Stephan Foster et al. (2000) "Ground Water in Rural Development" Technical Paper No. 463, World Bank, Washington D.C.

ANNEX

Table A.1: Internal Renewable Water Resources, 1998-2002

	Average Precipitation (million m^3/yr)	Annual Internal Renewable Water Resources		
		(million m^3/yr)	As of Precipitation	Per capita m^3/yr
Bahrain	59	4	6.8	6
Egypt	51074	1800	3.5	26
Iraq	94677	35200	37.2	1436
Jordan	9902	680	6.9	128
Kuwait	2156	0	0.0	0
Lebanon	6874	4800	69.8	1335
Oman	38688	985	2.5	356
Palestine		46		43
Qatar	814	51	6.3	85
Saudi Arabia	126832	2400	1.9	102
Syria	46665	7000	15.0	403
United Arab Emirates	6521	150	2.3	51
Yemen	88171	4100	4.7	212
ESCWA	**472433**	**57216**	**12.1**	**137.5**
Afghanistan	213233	55000	25.8	2399
Albania	42694	26900	63.0	8564
Algeria	211975	13900	6.6	445
Azerbaijan	38710	8100	20.9	978
Bangladesh	383904	105000	27.4	730
Benin	117012	10300	8.8	1571
Brunei	15710	8500	54.1	24286
Burkina Faso	204952	12500	6.1	990
Cameroon	762706	273000	35.8	17356
Chad	413448	15000	3.6	1797
Comoros	2007	1200	59.8	1606
Côte d'Ivoire	434676	76700	17.6	4687
Djibouti	5104	300	5.9	433
Gabon	490104	164000	33.5	125574
Gambia	9447	3000	31.8	2161
Guinea	405915	226000	55.7	27037
Guinea-Bissau	56961	16000	28.1	11042
Guyana	513133	241000	47.0	315445
Indonesia	5146148	2838000	55.1	13070
Iran	375790	128500	34.2	1888
Kazakhstan	681225	75420	11.1	4876
Kyrgyz Republic	106547	46450	43.6	9167
Libya	98534	600	0.6	110
Malaysia	948031	580000	61.2	24202
Maldives	592	30	5.1	97
Mali	349734	60000	17.2	4753
Mauritania	94348	400	0.4	143
Morocco	154506	29000	18.8	964
Mozambique	827241	99000	12.0	5341
Niger	191317	3500	1.8	303
Nigeria	1062336	221000	20.8	1828
Pakistan	393273	52400	13.3	350
Senegal	134950	26400	19.6	2679
Sierra Leone	181215	160000	88.3	33585
Somalia	179820	6000	3.3	633
Sudan	1042417	30000	2.9	912
Suriname	380582	88000	23.1	203704
Tajikistan	98502	66300	67.3	10702
Togo	66331	11500	17.3	2395
Tunisia	33867	4150	12.3	427
Turkey	459468	227000	49.4	3228
Turkmenistan	78584	1360	1.7	284
Uganda	284427	39000	13.7	1560
Uzbekistan	92164	16340	17.7	636
Other OIC Counties	**17783640**	**6066750**	**34.1**	**5091.7**
OIC Countries	**18256073**	**6123966**	**33.5**	**4499.4**
World	**107924000**	**43764000**	**40.6**	**7243.0**

Source: AQUASTAT.

Table A.2: Total Renewable Water Resources, 1998-2002

	Total Renewable Water Resources (million m^3/yr)	**Total Renewable Water Resources per Capita**	**Dependency Ratio**
	Actual	**m^3/yr**	**(%)**
Bahrain	116	167	96.5
Egypt	58300	827	96.9
Iraq	75420	3077	53.3
Jordan	880	165	22.7
Kuwait	20	8	100.0
Lebanon	4407	1226	0.8
Oman	985	356	0.0
Palestine	56	52	17.8
Qatar	53	88	3.7
Saudi Arabia	2400	102	0.0
Syria	26260	1511	80.2
United Arab Emirates	150	51	0.0
Yemen	4100	212	0.0
ESCWA	**173147**	**611**	
Afghanistan	65000	2835	15.4
Albania	41700	13276	35.5
Algeria	14320	458	2.9
Azerbaijan	30275	3649	73.1
Bangladesh	1210642	8418	91.3
Benin	24800	3782	58.4
Brunei	8500	24286	0.0
Burkina Faso	12500	990	0.0
Cameroon	285500	18151	4.3
Chad	43000	5151	65.1
Comoros	1200	1606	0.0
Côte d'Ivoire	81000	4950	5.3
Djibouti	300	433	0.0
Gabon	164000	125574	0.0
Gambia	8000	5764	62.5
Guinea	226000	27037	0.0
Guinea-Bissau	31000	21394	48.3
Guyana	241000	31544.5	0.0
Indonesia	2838000	13070	0.0
Iran	137510	2020	6.5
Kazakhstan	109610	7086	31.1
Kyrgyz Republic	20580	4062	0.0
Libya	600	110	0.0
Malaysia	580000	24202	0.0
Maldives	30	97	0.0
Mali	100000	7922	40.0
Mauritania	11400	4061	96.4
Morocco	29000	964	0.0
Mozambique	216110	11658	54.1
Niger	33650	2915	89.5
Nigeria	286200	2367	22.7
Pakistan	222670	1485	76.4
Senegal	39400	3998	32.9
Sierra Leone	160000	33585	0.0
Somalia	14200	1498	57.7
Sudan	64500	1962	76.9
Suriname	122000	282407	27.8
Tajikistan	15980	2579	16.7
Togo	14700	3062	21.7
Tunisia	4560	469	8.9
Turkey	213550	3037	1.5
Turkmenistan	24720	5156	97.0
Uganda	66	2640	40.9
Uzbekistan	50410	1961	77.3
Other OIC Counties	**7798183**	**6544**	
OIC Countries	**7971330**	**5834**	

Source: AQUASTAT.

Table A.3: Water Withdrawal by Sector, 1998-2002

	Total Water Withdrawal (million m^3/yr)	**Total Water Withdrawal as Percentage of Total Renewable Water Resources** (%)	**Agricultural Water Withdrawal** (million m^3/yr)	**Domestic Water Withdrawal** (million m^3/yr)	**Industrial Water Withdrawal** (million m^3/yr)	**Agricultural Water Withdrawal as Part of Total** (%)	**Domestic Water Withdrawal as Part of Total** (%)	**Industrial Water Withdrawal as Part of Total** (%)
Bahrain	300	258.6	170	120	10	57	40	3
Egypt	68650	117.7	53850	5230	9570	78	8	14
Iraq	42700	56.6	39380	1350	1970	92	3	5
Jordan	1010	114.7	7600	210	40	75	21	4
Kuwait	440	2200	230	200	10	52	46	2
Lebanon	1380	31.3	920	450	10	67	32	1
Oman	1360	138	1230	100	30	91	7	2
Palestine								
Qatar	290	547.1	210	70	10	72	24	4
Saudi Arabia	17320	721.6	15420	1700	200	89	10	1
Syria	19950	75.9	18930	660	360	95	3	2
United Arab Emirates	2300	1533.3	1570	530	200	68	23	9
Yemen	6630	161.7	6320	270	40	95	4	1
ESCWA	**162330**		**145830**	**10890**	**12450**			
Afghanistan	23260	35.7	22840	420	0	98	2	0
Albania	1710	4.1	1060	460	190	62	27	11
Algeria	6070	42.3	3940	1330	800	65	22	13
Azerbaijan	17250	56.9	11650	830	4770	67	5	28
Bangladesh	79400	6.5	76350	2530	520	96	3	1
Benin	130	0.52	59	41	30	45	32	23
Brunei								
Burkina Faso	780	6.2	690	90	0	88	12	0
Cameroon	990	0.34	730	180	80	74	18	8
Chad	230	0.53	190	40	0	83	17	0
Comoros								
Côte d'Ivoire	930	1.14	600	220	110	64	24	12
Djibouti	8	2.6	7	1	0	88	12	0

Table A.3: Water Withdrawal by Sector, 1998-2002 (continued)

	Total Water Withdrawal (million m^3/yr)	**Total Water Withdrawal as Percentage of Total Renewable Water Resources** (%)	**Agricultural Water Withdrawal** (million m^3/yr)	**Domestic Water Withdrawal** (million m^3/yr)	**Industrial Water Withdrawal** (million m^3/yr)	**Agricultural Water Withdrawal as Part of Total** (%)	**Domestic Water Withdrawal as Part of Total** (%)	**Industrial Water Withdrawal as Part of Total** (%)
Gabon	120	0.07	50	60	10	42	50	8
Gambia	30.6	0.38	20	7	3.6	65	23	12
Guinea	1510	0.66	1360	120	30	90	8	2
Guinea-Bissau	110.6	0.35	100	10	0.6	90	9	1
Guyana	1640	0.68	1600	30	10	97	2	1
Mauritania	1700	14.9	1500	150	50	88	9	3
Morocco	12750	43.9	11480	1070	200	90	8	2
Mozambique	630	0.2	550	70	10	87	11	2
Niger	2180	6.4	2080	90	10	95	4	1
Nigeria	8010	2.7	5510	1690	810	69	21	10
Pakistan	169390	76	162650	3270	3470	96	2	2
Senegal	2225	5.6	2065	100	60	93	4	3
Sierra Leone	380	0.2	350	20	10	92	5	3
Somalia	3290	23.1	3280	10	0	100	0	0
Sudan	37320	57.8	36070	990	260	96	3	1
Suriname	670	0.54	620	30	20	93	4	3
Tajikistan	11960	74.8	10960	440	560	91	4	5
Togo	169	1.1	76	89	4	45	53	2
Tunisia	2640	57.8	2165	365	110	82	14	4
Turkey	37530	17.5	27860	5560	4110	74	15	11
Turkmenistan	24650	99.7	24040	420	190	97	2	1
Uganda	300	0.4	120	130	50	40	43	17
Uzbekistan	58340	115.7	54370	2770	1200	93	5	2
Other OIC Counties	**728877**		**661946**	**38833**	**28098.2**			
OIC Countries	**891207**		**807776**	**49723**	**40548.2**			
World, 1990	**3240000**		**2235600**	**259200**	**745200**			

Source: AQUASTAT.

Table A.4: Total Irrigation Area and Water Managed Area (000 hectares)

	Total Irrigation Area	**f/p control** (1)	**Spate** (2)	**Equip. Wet/ivb** (3)	**Flood Recession Cropping**	**Water Managed Area**
Bahrain	4	4	0	0	0	4
Egypt	3400	3422	0	0	0	3422
Iraq	3525	3525	0	0	0	3525
Jordan	77	77	0	0	0	77
Kuwait	13	13	0	0	0	13
Lebanon	104	104	0	0	0	104
Oman	73	73	0	0	0	73
Palestine	20	20	0	0	0	20
Qatar	13	13	0	0	0	13
Saudi Arabia	1731	1731	0	0	0	1731
Syria	1333	1333	0	0	0	1333
United Arab Emirates	76	76	0	0	0	76
Yemen	500	397	103	0	0	500
ESCWA	**10869**	**10788**	**103**	**0**	**0**	**10891**
Albania	340	340	0	0	0	340
Algeria	560	513	56	0	0	569
Azerbaijan	1455	1453	0	0	0	1453
Bangladesh	4597	3751	0	0	0	3751
Benin	12	11	0	7	0	19
Brunei	1	1	0	0	0	1
Burkina Faso	25	19	0	21	0	46
Cameroon	33	22	3	0	0	26
Chad	20	30	0	0	125	155
Comoros						
Côte d'Ivoire	73	73	0	16	0	89
Djibouti		1	0	0	0	1
Gabon	15					
Gambia	2	2	0	13	0	15
Guinea	95	20	0	0	6	95
Guinea-Bissau	17	9	0	29	0	52
Guyana	150	150	0	0	0	150
Indonesia	4815	4428	0	3841	0	8269
Iran	7500	7264	0	0	10	7274
Kazakhstan	2350	2313	1105	0	0	3556
Kyrgyz Republic	1077	1077	0	0	0	1077
Libya	470	470	0	0	0	470
Malaysia	363	341	0	0	0	363
Maldives						
Mali	236	98	0	0	60	296
Mauritania	49	49	0	0	64	113
Morocco	1345	1156	189	0	0	1345
Mozambique	107	107	0	0	0	107
Niger	73	13	0	0	0	85
Nigeria	233	220	0	0	724	957
Pakistan	17800					
Senegal	120	102	0	0	30	150
Sierra Leone	30	1	0	126	0	156
Somalia	180					
Sudan	1863	1731	132	0	0	1863
Suriname	51	51	0	0	0	51
Tajikistan	719	719	0	0	0	719
Togo	7	2	0	0	0	7
Tunisia	394	367	27	0	0	394
Turkey	4186	4071	0	0	0	4186
Turkmenistan	1744	1744	0	0	0	1744
Uganda	9	6	0	50	0	59
Uzbekistan	4281	4281	0	0	0	4281
Other OIC Counties	**57408**	**37006**	**1512**	**4103**	**1019**	**44284**
OIC Countries	**68277**	**47794**	**1615**	**4103**	**1019**	**55175**
World	**276719**				**27757**	**304476**
ESCWA Countries	**3.9**				**0**	**3.5**
Other OIC Countries	**20.7**				**3.7**	**14.5**
OIC Countries	**24.7**				**3.6**	**18.1**

Source: FAO's Information System on Water and Agriculture (AQUASTAT).
Notes: (1) Full/Partial (f/p) control irrigation equipped area.
(2) Spate irrigation area.
(3) Equipped wetland and inland valley bottoms.

Table A.5: Total Irrigation Area as % of Total Land, Agricultural and Arable Area

		Total Irrigation Area as % of		
	Irrigated Land (1)	**Total Land Area**	**Agricultural Area**	**Arable Area**
Bahrain	4	5.6	40.0	200.0
Egypt	3400	3.4	100.0	120.5
Iraq	3525	7.3	31.7	60.4
Jordan	77	0.8	6.6	31.0
Kuwait	13	0.7	8.6	130.0
Lebanon	104	10.2	31.6	54.7
Oman	73	0.2	5.7	163.2
Palestine	20	3.3	5.2	18.0
Qatar	13	1.2	18.3	72.2
Saudi Arabia	1731	0.8	0.9	45.1
Syria	1333	7.3	9.7	29.3
United Arab Emirates	76	0.9	13.3	126.7
Yemen	500	0.9	2.8	32.4
ESCWA	**10869**	**2.2**	**4.7**	**56.4**
Albania	340	12.4	29.8	58.8
Algeria	560	0.2	1.4	7.3
Azerbaijan	1455	17.6	31.0	82.7
Bangladesh	4597	35.3	50.9	56.5
Benin	12	0.1	0.4	0.5
Brunei	1	0.2	5.3	14.3
Burkina Faso	25	0.1	0.2	0.6
Cameroon	33	0.1	0.4	0.6
Chad	20	0.0	0.0	0.6
Comoros		0.0	0.0	0.0
Côte d'Ivoire	73	0.2	0.4	2.4
Djibouti				
Gabon	15	0.1	0.3	4.6
Gambia	2	0.2	0.3	0.9
Guinea	95	0.4	0.8	10.7
Guinea-Bissau	17	0.6	1.0	5.7
Guyana	150	0.8		19.2
Indonesia	4815	2.7	10.7	23.5
Iran	7500	4.6	12.3	52.4
Kazakhstan	2350	0.9	1.1	10.9
Kyrgyz Republic	1077	5.6	9.9	78.4
Libya	470	0.3	3.0	25.9
Malaysia	363	1.1	4.6	20.1
Maldives		0.0	0.0	
Mali	236	0.1	0.4	3.0
Mauritania	49	0.0	0.1	10.0
Morocco	1345	3.0	4.4	15.3
Mozambique	107	0.1	0.2	2.7
Niger	73	0.1	0.4	1.5
Nigeria	233	0.3	0.3	0.8
Pakistan	17800	23.1	65.6	83.6
Senegal	120	0.4	0.9	3.0
Sierra Leone	30	0.4	1.1	6.1
Somalia	180	0.3	0.4	17.6
Sudan	1863	0.8	1.5	12.0
Suriname	51	0.3		89.5
Tajikistan	719	5.1	16.9	77.3
Togo	18	0.3	0.5	0.7
Tunisia	394	2.5	3.9	13.3
Turkey	4186	6.8	12.5	21.6
Turkmenistan	1744	3.8	5.5	97.3
Uganda	9	0.0	0.1	0.2
Uzbekistan	4281	10.3	15.8	95.7
Other OIC Counties	**57408**	**3.1**	**7.3**	**34.4**
OIC Countries	**68277**	**3.0**	**6.9**	**35.9**
World	**276719**	**3.3**	**6.8**	**19.7**

Source: FAO Statistical Yearbook, 2004.
(1) 2002.

Table A.6: Source of Irrigation Water, 1998-2002

	% of Full/partial Control Irrigation Area		
	Surface Water	**Ground Water**	**Non-conventional Sources**
Bahrain	0.0	86.4	13.6
Egypt	95.4	4.5	0.1
Iraq	93.8	6.2	0.0
Jordan	39.7	54.6	5.7
Kuwait	0.0	61.0	39.0
Lebanon	54.3	45.7	0.0
Oman	0.0	100.0	0.0
Palestine			
Qatar	0.0	94.2	5.8
Saudi Arabia	3.2	95.6	1.2
Syria	39.8	60.2	0.0
United Arab Emirates	0.0	100.0	0.0
Yemen	0.0	100.0	0.0
ESCWA			
Afghanistan	84.6	15.4	0.0
Albania			
Algeria			
Azerbaijan	93.0	7.0	0.0
Bangladesh	30.8	69.2	0.0
Benin	99.6	0.4	0.0
Brunei	100.0	0.0	0.0
Burkina Faso			
Cameroon			
Chad			
Comoros			
Côte d'Ivoire	100.0	0.0	0.0
Djibouti	0.0	100.0	0.0
Gabon			
Gambia			
Guinea	100.0	0.0	0.0
Guinea-Bissau	88.3	11.7	0.0
Guyana			
Indonesia	99.0	1.0	0.0
Iran	49.9	50.1	0.0
Kazakhstan	90.0	8.0	2.0
Kyrgyz Republic	99.0	1.0	0.0
Libya			
Malaysia	92.0	8.0	0.0
Maldives			
Mali	97.4	2.6	0.0
Mauritania	90.4	9.6	0.0
Morocco	68.3	31.1	0.6
Mozambique			
Niger			
Nigeria			
Pakistan	66.0	34.0	0.0
Senegal			
Sierra Leone			
Somalia			
Sudan	96.0	4.0	0.0
Suriname	100.0	0.0	0.0
Tajikistan	87.0	9.0	3.0
Togo	98.1	1.9	0.0
Tunisia	37.3	60.7	2.0
Turkey	83.5	16.5	0.0
Turkmenistan	98.0	2.0	0.0
Uganda			
Uzbekistan	94.0	6.0	0.0
Other OIC Counties			
OIC Countries			

Source: AQUASTAT.

Table A.7: Total Irrigation Area and Water Managed Area
(000 hectares)

	% of Full/partial (f/p) Control Irrigation Area		
	Surface Irrigation	**Sprinkler Irrigation**	**Micro-Irrigation**
Bahrain	83	3	17
Egypt	94	4	3
Jordan	31	9	59
Kuwait	60	12	24
Lebanon	61	24	15
Oman	94	3	3
Saudi Arabia	34	64	2
Syria	97	3	0
United Arab Emirates	37	6	57
Yemen	10	0	0
ESCWA			
Algeria	0	9	0
Azerbaijan	90	10	0
Bangladesh	100	0	0
Benin	45	45	9
Brunei	100	0	0
Burkina Faso	79	21	0
Cameroon	77	23	0
Chad	87	13	0
Côte d'Ivoire	16	49	0
Gambia	100	0	0
Guinea	100	0	0
Guinea-Bissau	100	0	0
Guyana	100	0	0
Indonesia	100	0	0
Iran	99	1	0
Kazakhstan	76	24	0
Kyrgyz Republic	97	3	0
Libya	0	100	0
Malaysia	100	0	0
Mali	100	0	0
Morocco	90	9	0
Senegal	100	0	0
Sierra Leone	100	0	0
Suriname	98	2	0
Tajikistan	100	0	0
Togo	100	0	0
Tunisia	83	16	2
Turkey	94	6	0
Turkmenistan	100	0	0
Uganda	83	17	0
Uzbekistan	100	0	0

Source: FAO's Information System on Water and Agriculture (AQUASTAT).

Table A.8: Irrigation Intensity and Irrigation Potential

	Rate of Equipped Area (f/p) Actually Irrigated (%)	**Irrigated Crops Area** (000 hectares)	**Cropping Intensity Ratio**	**Irrigation Potential Area** (000 hectares)
Bahrain	100	3	1	4
Egypt	100		1.66	4435
Iraq	54.9			5554
Jordan		69	1.08	85
Kuwait	100	5	1	25
Lebanon		88	1	178
Oman	100	71	1.15	86
Qatar	66.4	9	0.69	62
Saudi Arabia	100	1608	1	1620
Syria		1204	1.19	1250
United Arab Emirates	81.7	55	0.82	76
Yemen				490
ESCWA				
Algeria	82.2			730
Azerbaijan				1720
Bangladesh	98			
Benin	23			322
Burkina Faso	100			165
Chad	87			335
Côte d'Ivoire	92			475
Djibouti	60.4	0.4	0.4	1
Gabon				
Gambia				80
Guinea	100			520
Guinea-Bissau	100			281
Iran	100			15000
Kazakhstan	65			3769
Kyrgyz Republic	100			2247
Libya	51.1			750
Malaysia	100			414
Mali	75			566
Mauritania	54.4	135	1.19	221
Morocco	98	1073	0.85	1653
Mozambique	34			3072
Niger	89			270
Nigeria	74			2331
Pakistan				
Senegal	97			409
Somalia		164	0.82	240
Sudan	63.2	1012	0.52	2784
Tajikistan	100			755
Togo	86			180
Tunisia	90.7	308	0.8	563
Turkey	74			8500
Turkmenistan	100			2353
Uganda	64			90
Uzbekistan	98			4915
Other OIC Countries				
OIC Countries				
World				

Source: FAO's Information System on Water and Agriculture (AQUASTAT).

Table A.9: Population in Agriculture and Share of Agriculture in GDP, 2004

	Share of Agriculture in GDP (%)*	**Total Population** (million)	**Population in Agriculture** (million)	**Share of Population in Agriculture** (%)
Bahrain	1	0.73	0.01	0.82
Egypt	17	73.39	22.60	30.79
Jordan	2	5.61	0.56	9.98
Kuwait	1	2.59	0.03	1.04
Lebanon	12	3.71	0.11	2.83
Oman	1	2.93	0.98	33.45
Palestine	8	3.68	0.38	10.33
Qatar	1	0.61	0.01	0.98
Saudi Arabia	5	24.91	1.84	7.39
Syria	23	18.22	4.77	26.18
U.A.E.	4	3.05	0.12	3.93
Yemen	15	20.73	9.61	46.36
ESCWA	**8**	**160.16**	**41.00**	**25.60**
Albania	26	3.19	1.45	45.45
Algeria	10	32.33	7.52	23.26
Azerbaijan	16	8.44	2.11	25.00
Bangladesh	24	149.66	77.40	51.72
Benin	36	6.91	3.46	50.07
Brunei	2	0.36	0.00	0.56
Burkina Faso	32	13.30	12.30	92.48
Cameroon	43	16.20	8.90	54.94
Chad	38	8.85	6.32	71.37
Comoros	39	0.79	0.56	70.89
Cote d'Ivoire	26	16.89	7.57	44.82
Djibouti	4			
Gabon	7	1.35	0.44	32.86
Gambia	31	1.46	1.13	77.40
Guinea	24	8.62	7.09	82.25
Guinea-Bissau	62	1.53	1.25	81.70
Guyana	31	0.76	0.12	15.79
Indonesia	17	222.61	101.64	45.66
Iran	13	69.78	17.24	24.71
Kazakhstan	9	15.40	2.47	16.04
Kyrgyz Republic	38	5.21	1.22	23.43
Libya	8	5.65	0.26	4.65
Malaysia	9	24.87	3.95	15.88
Maldives	11			
Mali	37	13.40	10.50	78.36
Mauritania	21	2.98	1.54	51.68
Morocco	16	31.06	10.28	33.10
Mozambique	25	19.18	15.40	80.29
Niger	40	12.41	10.78	86.87
Nigeria	34	127.11	37.82	29.75
Pakistan	25	157.31	70.97	45.11
Senegal	18	10.33	7.48	72.41
Sierra Leone	51	5.16	3.10	60.08
Sudan	40	34.33	19.70	57.38
Suriname	11	0.43	0.08	18.60
Tajikistan	26	6.29	1.96	31.16
Togo	40	5.01	2.87	57.29
Tunisia	12	9.93	2.29	23.06
Turkey	14	72.32	31.34	43.34
Turkmenistan	27	4.94	1.57	31.78
Uganda	35	26.69	20.85	78.12
Uzbekistan	34	26.47	6.62	25.01
Other OIC	**17**	**1179.51**	**519.56**	**44.05**
OIC	**14**	**1339.67**	**560.56**	**41.84**
World		**6410.00**	**2680.40**	**41.82**
Developing Countries		**5390.00**	**2474.00**	**45.90**

Source: FAO Statistical Yearbook, 2004.
(*) 1999-2003 average.

Table A.10: Land Area Used in Agriculture (000 hectares)*, **2002**

	Total Land Area	Agricultural Land	Arable Land	Permanent Crops Land	Permanent Pasture
Bahrain	71	10	2	4	4
Egypt	99545	3400	2821	470	
Iraq (1)	43737	10090	5300	290	4000
Jordan	8893	1142	242	157	742
Kuwait	1782	151	10	2	136
Lebanon	1023	329	190	142	16
Oman	30950	1081	38	42	1000
Palestine	602	381	111	120	150
Qatar	1100	71	18	3	50
Saudi Arabia	214969	173794	3592	193	170000
Syria	18378	13759	4542	810	8338
United Arab Emirates	8360	571	60	187	305
Yemen	52797	17734	1545	124	16065
ESCWA	**482207**	**222513**	**18471**	**2544**	**200806**
Afghanistan	65209	38054	7910	144	30000
Albania	2740	1140	578	121	441
Algeria	238174	40065	7662	530	31800
Azerbaijan	8260	4692	1760	240	2683
Bangladesh	13017	9029	8134	600	600
Benin	11062	3365	2380	550	550
Brunei	527	19	7	6	6
Burkina Faso	27360	10400	4050	50	6000
Cameroon	46540	9160	5960	1200	2000
Chad	125920	48630	3520	30	45000
Comoros	223	147	80	50	15
Côte d'Ivoire	31800	19900	3100	3800	13000
Djibouti	2318	1301			1300
Gabon	25767	5160	325	170	4665
Gambia	1000	714	230	5	459
Guinea	24572	12240	885	625	10700
Guinea-Bissau	2812	1628	300	248	1080
Guyana	19685		780	320	
Indonesia	181157	44877	20500	13100	11177
Iran	163620	61088	14324	2002	44000
Kazakhstan	269970	206769	21535	136	185098
Kyrgyz Republic	19180	10776	1368	67	9365
Libya	175954	15450	1815	335	13300
Malaysia	32855	7870	1820	5785	285
Maldives	30	13			1
Mali	122019	34700	4634	40	30000
Mauritania	102522	39750	488	12	39250
Morocco	44630	30283	8767	885	21000
Mozambique	78409	48435	3900	235	44000
Niger	126670	16500	4487	13	12000
Nigeria	91077	72200	28200	2650	39200
Pakistan	77088	27120	21302	658	5000
Senegal	19253	8156	2355	45	5650
Sierra Leone	7162	2800	490	60	2200
Somalia (1)	62734	44071	1022	20	43000
Sudan	237600	133833	16233	420	117180
Suriname	15600		57	10	
Tajikistan	13996	4255	930	128	3198
Togo	5439	3630	2510	120	1000
Tunisia	15536	9763	2864	2126	4855
Turkey	76963	41690	24138	2534	13167
Turkmenistan	46993	32615	1850	65	30700
Uganda	19710	12312	5060	2100	5112
Uzbekistan	41424	27046	4475	350	22219
Other OIC Counties	**2694577**	**1141646**	**242785**	**42585**	**852256**
OIC Countries	**3176784**	**1364159**	**261256**	**45129**	**1053062**
World	**13066799**	**5012266**	**1404130**	**136578**	**3471729**
Developing Countries	**7604099**	**3185857**	**792701**	**106447**	**2286880**

Source: FAO Statistical Yearbook, 2004.
(*) 1 hectare=0.01km^2, (1) 1990.

Table A.11: Agricultural Production, 2003

	Per Capita Agricultural Production Index (1999-2001=100.0)	Agricultural Production (000 tons)		
		Cereals	Fruit and Vegetables	Meat
Bahrain	84.2		32	17
Egypt	95.5	19231	21523	1445
Iraq				
Jordan	122.2	80	1455	123
Kuwait	104	3	193	83
Lebanon	95.6	144	1699	203
Oman	86.7	6	478	42
Palestine	89.7	68	750	116
Qatar	112.8	6	73	15
Saudi Arabia	100.6	2353	3109	642
Syria	107.5	6235	3627	368
United Arab Emirates	52.7	0	1344	74
Yemen	98.7	516	1262	215
ESCWA		**28642**	**35545**	**3343**
Afghanistan				
Albania	103.9	507	819	75
Algeria	109.5	4227	4615	553
Azerbaijan	116.2	1993	2031	134
Bangladesh	97.9	39683	3294	441
Benin	101.7	1019	606	50
Brunei	105.8	0	16	18
Burkina Faso	116.5	3582	306	145
Cameroon	104.2	1646	3492	218
Chad	99.4	1396	208	122
Comoros	94.6	21	67	2
Côte d'Ivoire	89.2	1558	2634	170
Djibouti				
Gabon	95.4	32	329	32
Gambia	65.6	171	13	7
Guinea	101.3	1087	1580	55
Guinea-Bissau	93.8	156	99	19
Guyana	105.2	506	110	27
Indonesia	104.4	62989	15083	1946
Iran	106.2	21110	24509	1603
Kazakhstan	108.4	14763	2736	670
Kyrgyz Republic	98.2	1633	982	201
Libya	95.4	215	1142	142
Malaysia	107.2	2217	1627	1074
Maldives				
Mali	101.9	2543	362	259
Mauritania	97.6	153	31	79
Morocco	116.3	7963	6759	598
Mozambique	98.9	1811	408	94
Niger	98.6	3386	665	130
Nigeria	96.8	24457	17419	1042
Pakistan	96.4	27753	10308	1892
Senegal	86.6	886	588	162
Sierra Leone	96.5	283	392	22
Somalia				
Sudan	103.2	6410	3007	698
Suriname	104.1	195	92	9
Tajikistan	114.6	868	735	31
Togo	102.6	816	187	33
Tunisia	89.3	1503	3101	250
Turkey	95.3	30798	36871	1348
Turkmenistan	87.9	2688	701	133
Uganda	99.2	2311	11224	293
Uzbekistan	99.3	5942	4585	508
Other OIC Counties		**281277**	**163733**	**15285**
OIC Countries		**309919**	**199278**	**18628**
World	**101.2**	**2075309**	**1322454**	**253528**

Source: FAO Statistical Yearbook, 2004.

Table A.12: Agricultural Imports and Exports, 2002

	Agricultural Imports (million $)	**Share of Agricultural Imports in Total Imports** (%)	**Share of Food in Agricultural Imports** (%)	**Agricultural Exports** (million $)	**Share of Agricultural Exports** (%)	**Share of Food in Agricultural Exports** (%)
Bahrain	558	11.33	79.5	42	0.74	68.65
Egypt	3437	23.47	77.45	774	11.65	48.9
Iraq						
Jordan	832	16.64	80.89	412	14.93	60.91
Kuwait	811	9.02	87.06	37	0.24	76.38
Lebanon	1169	18.14	79.32	112	18.14	72.89
Oman	1257	20.69	54.98	631	5.59	36.27
Palestine	577	25.13	77.79	106	25.56	72.85
Qatar	479	11.1	85.73	11	0.11	76.65
Saudi Arabia	5141	15.91	83.92	526	0.75	90.83
Syria	782	15.04	73.45	1064	19.02	77.96
United Arab Emirates	3147	5.72	75.27	1320	1.55	61.39
Yemen	841	23.3	92.03	81	2.41	50.23
ESCWA	**19031**		**13915**	**5116**		
Afghanistan						
Albania	297	19.78	76.35	25	7.72	12.67
Algeria	3036	25.37	89.85	40	0.22	71.8
Azerbaijan	234	14.09	81.29	90	4.18	39.88
Bangladesh	1404	16.57	82.23	100	1.69	15.8
Benin	196	29.88	80.54	211	56.41	34.29
Brunei	204	12.66	79.72	1	0.05	52.51
Burkina Faso	133	18.17	77.89	153	65.03	28.7
Cameroon	170	9.28	93.24	483	23.97	63.32
Chad	51	5.11	75.97	103	54.49	54.02
Comoros	20	24.3	86.36	8	21.97	100
Côte d'Ivoire	461	12.48	83.99	3006	58.19	85.48
Djibouti						
Gabon	158	16.73	81.09	2	0.13	43.66
Gambia	77	28.77	77.64	18	64.97	86.84
Guinea	159	16.8	82.16	21	3.88	73.95
Guinea-Bissau	41	39.68	84.11	47	88.32	92.55
Guyana	91	16.26	81.85	158	32.03	90.58
Indonesia	4201	13.42	64.62	6207	10.89	67.49
Iran	2106	9.49	81.36	1107	4.53	88.41
Kazakhstan	531	8.08	80.72	719	7.44	81.59
Kyrgyz Republic	78	13.34	67	126	26.02	23.31
Libya	978	19.26	86.59	10	0.15	6.69
Malaysia	4300	5.38	73.16	7373	7.9	76.53
Maldives						
Mali	155	20.75	73.02	264	28.84	30.71
Mauritania	249	55.44	72.97	34	9.09	97.01
Morocco	1740	14.94	78.73	810	10.43	86.99
Mozambique	330	21.68	79.15	76	8.97	45.61
Niger	170	42.62	81.61	81	29.08	86.2
Nigeria	1996	26.45	87.38	407	2.7	80.96
Pakistan	1563	13.92	61.2	989	9.98	87.13
Senegal	526	33.69	89.05	128	11.58	59.81
Sierra Leone	157	29.2	88.3	7	7.92	49.87
Somalia						
Sudan	478	24.98	79.53	370	21.55	75.95
Suriname	76	13.6	64.18	48	9.8	98.09
Tajikistan	133	18.57	92.87	141	19.25	12.4
Togo	83	14.14	86.49	86	34.64	43.58
Tunisia	1021	10.74	75.55	390	5.69	77.23
Turkey	3070	6	45.39	3476	9.72	81.52
Turkmenistan	111	5.27	68.59	144	5.06	3.69
Uganda	153	13.79	88.17	252	56.96	12.89
Uzbekistan	198	7.3	86.54	853	28.57	10.51
Other OIC Counties	**31135**			**28564**		
OIC Countries	**50166**		**16486**	**33680**		
World	**464034**	**7**	**69**	**442057**	7	69

Source: FAO Statistical Yearbook, 2004.

Table A.13: Prevalence of Undernourishment, 2000-2002

	Number of Undernourished People	Proportion of the Undernourished in Total Population
Bahrain		
Egypt	2.4	3
Iraq		
Jordan	0.4	7
Kuwait	0.1	5
Lebanon	0.1	3
Oman		
Palestine		
Qatar		
Saudi Arabia	0.8	3
Syria	0.6	4
United Arab Emirates		
Yemen	6.7	36
ESCWA	**11.1**	
Afghanistan		
Albania	0.2	6
Algeria	1.7	5
Azerbaijan	1.2	15
Bangladesh	42.5	30
Benin	0.9	15
Brunei		
Burkina Faso	2.3	19
Cameroon	3.9	25
Chad	2.7	34
Comoros		
Côte d'Ivoire	2.2	14
Djibouti		
Gabon	0.1	6
Gambia	0.4	27
Guinea	2.1	26
Guinea-Bissau		
Guyana	0.1	9
Indonesia	12.6	6
Iran	2.7	4
Kazakhstan	2	13
Kyrgyz Republic	0.3	6
Libya		
Malaysia		
Maldives		
Mali	3.6	29
Mauritania	0.3	10
Morocco	2	7
Mozambique	8.5	47
Niger	3.8	34
Nigeria	11	9
Pakistan	29.3	20
Senegal	2.3	24
Sierra Leone	2.3	50
Somalia		
Sudan	8.5	27
Suriname	0	11
Tajikistan	3.7	61
Togo	1.2	26
Tunisia		
Turkey	1.8	3
Turkmenistan	0.4	9
Uganda	4.6	19
Uzbekistan	6.6	26
Other OIC Counties	**167.8**	
OIC Countries	**178.9**	
Developing World	814.6	17

Source: FAO Statistical Yearbook, 2004.