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COUNTRY PROFILE[1]

SYRIA

NATURAL CONDITIONS IN SYRIA

Syria, officially the Syrian Arab Republic, is a country in Southwest Asia, bordering Lebanon, the Mediterranean Sea and the island of Cyprus to the west, Israel to the southwest, Jordan to the south, Iraq to the east, and Turkey to the north.
Population growth is among the important issues threatening the country's natural resources. Indeed, in 2006 the population was 19.5 millions, with an annual rate of natural increase of 2.5% whereas Syria's total area is 185180 km^2, of which 61000 km^2 (32.9%) are arable lands. The rangelands and forests cover about 89000 km^2 and the remained is uncultivable land.

In Syria, precipitation starts between October and May. Rainfall varies from one region to another; in the coastal western mountains rainfall is regular while it is varied and semi-regular in the inland regions (Table 1). In general, most Syrian lands are dry or semi-dry and more than half of the country's area has a yearly rainfall lower than 220 and this rainfall is irregular from one year to another. The country sometimes faces dry years. Average precipitation is more than 46.0 billion m^3, one third of which falls on 60% of the total area; one third on an area of 15% and the remaining one third on 25%.

[1] The present document has been prepared by the General Commission for Scientific Agricultural Research-Ministry of Agriculture and Agrarian Reform (GCSAR). The EC declines all responsibility for any use that may be made thereof.

In Syria, evaporation rate varies from one region to another due to variation in temperature and humidity. Potential evaporation rate increases from the West to North-West down to East and South-East. It is 1200-1400 mm/year in coastal and mountainous regions, while it ranges between 2600 and 3000 mm/year in Eastern and South-Eastern regions.

Table 1. Average rainfall rates by agro-ecological zone in Syria

Zone	Area (1000 ha)	% out of total country area	Annual rainfall rate	Rainfall amount billion m^3/year
1st	2682.5	14.5	< 350 mm (1)	14.752
2nd	20460.5	13.3	350	8.612
3rd	1332	7.2	250	3.330
4th	1905.5	10.3	> 250 mm	4.763
5th	11119.5	54.7	> 200 mm (2)	15.179
Total	18500	100%	-	46.636

Source: The Annual Agricultural Statistical Abstract 2005
(1) Rainfall amount is calculated in 1st agro-ecological zone at a rate of 550 mm/year.

WATER RESOURCES AND USE IN SYRIA

Surface water in Syria consists of several rivers and lakes. There are 16 rivers and tributaries that flow in the country. Apart from rivers and tributaries, there are five lakes, the largest being Jabboul Lake near Aleppo. The most prominent lake is Al-Assad Lake. Among the rivers, 6 are mainly international, namely:

- The Euphrates, which comes from Turkey and flows to Iraq over 680 km in Syria.
- The Afrin in the North-Western part of Syria, which comes from Turkey to Syria and returns to the Alexandretta region that borders Turkey and Syria.
- The Orontes, which originates in Lebanon and flows through Syria into Turkey.
- The Yarmouk in the South-Western part of Syria with sources in Syria and Jordan and forms the border between these countries before flowing into the Jordan River.
- The Khabour, which originates from Turkey and merges with main Euphrates.
- The Tigris, forming the border between Syria and Turkey in far North-Eastern part.

The smaller rivers in Syria receive water from springs and, therefore, have seasonal transient flows. There is a strong interaction between groundwater levels and decreasing flow of springs, resulting in groundwater extraction to supplement the needs for different water-use sectors. Therefore, groundwater is used in conjunction with surface water and in some locations it is the only water resource.

Although most surface water has been developed in the major basins of Syria, there is some potential for further storage through dams. The storage capacity of the existing more than 150 dams is about 18 billion m^3. Al-Tabka, the largest dam, is in the Euphrates-Aleppo Basin with a storage capacity of 14.16 billion m^3. There are more than 40 dams in the Orontes Basin with a total storage capacity of one billion m^3. The remaining storage is provided by dams in other basins. Some dams in the Steppe Basin have been built to supply water for livestock. The major share of the stored water is drawn by agriculture. Studies have revealed that the average total inland water is 10635 $m.m^3$/yr and average groundwater including springs is 5256 $m.m^3$/yr, considering that the total regulated water is 14218 $m.m^3$/yr (Table 2).

Table 2. Water resources (surface and groundwater) in Syria (2005)

Water source	Hydrological basin							Total m.m^3
	Barada & Awaj	Yarmouk	Badia	Orontes	Coastal	Tigris - Khabour	Euphrate - Aleppo	
Surface (m.m^3)	19	168	152	1036	1453	735	7073	10635
Groundwater (m.m^3)	774	249	168	1499	726	1493	346	5256
Total (m.m^3)	793	417	320	2535	2179	2228	7419	15891
Regulation degree (%)	90	85	60	85	65	95	98	
Available regulated WR (m.m^3)	714	354	192	2155	1416	2117	7271	14218

Source: Ministry of Irrigation

The datasets on water availability and use have revealed that there is a negative annual balance exceeding three billion m^3 provided by groundwater over-pumping. In most basins, except for Coastal and Steppe Basins, there is a negative balance, which is evident from the enormous decrease in water table depth. For example, water table in Orontes Basin has decreased to 57 m during 1990s (Varela-Ortega and Sagardoy, 2003). In Barada-Awaj Basin, groundwater levels are declining at the rate of 1.1 m^3/yr. Recharge and surface flows in the basin are estimated at 714 million m^3/yr while withdrawal for irrigation from groundwater and surface water resources amounts to 786 million m^3/yr plus withdrawals of 269 million m^3/yr for domestic and 76 million m^3/yr for industrial purposes. These estimates reveal total withdrawal 1137 million m^3/yr, i.e. an overdraft of 417 m.m^3/yr. Of the volume used in different water-use sectors, nearly 90% is used as an irrigation source for agricultural production, followed by the shares from domestic (9%) and industrial (4%) sectors.

The Euphrates-Aleppo basin accounts for little under half of the total water used in Syria. Other basins provide a range of water supplies, with minor contribution coming from the Steppe Basin, which provides less than 2% of total water use. The government's policy objective of achieving food self-sufficiency, particularly in wheat, has resulted in rapid expansion of irrigated agriculture in the 1990s. Total irrigated area estimated at 652 thousand ha in 1985 has been doubled (Table 3) during the last 20 years.

Table 3. Development of irrigated agriculture by water source

Year	Surface water - irrigated area (1000 ha)	Groundwater - irrigated area (1000 ha)	Total irrigated area (1000 ha)
1985	334	318	652
1990	351	342	693
1995	388	694	1082
2000	512	698	1210
2002	583	764	1347
2004	624	815	1439
2005	697	795	1492

Source: The Annual Agricultural Statistical Abstract 2005

The demand for agricultural production is the main factor underlying groundwater overdraft, which is a vital challenge for WR management in Syria. Groundwater extraction provides a reliable supply of

water to the farmer compared to government surface irrigation schemes. On-farm application efficiency is in the range of 40-60%, which is considered low due to:

1. over-irrigation,
2. use of traditional irrigation techniques such as surface irrigation, and
3. inadequate land-levelling.

Table 4. Available water resources development and usage for different sectors

Water use		Barada & Awaj	Yarmouk	Badia	Orontes	Coastal	Tigris - Khabour	Euphrates - Aleppo	Total m.m^3
Agric. irrigation	Ground	785.8	211.8	68	1137.2	99.5	4305	1440.7	8048
	Surface	-	188.6	-	954.9	466.8	-	4314	5925.1
Domestic - drinking		269	76	44	240	81	38	322	1070
Industrial		76	38	2	229	85	45	86	561
Losses		6	31	15	148	16	132	1614	1962
Total use		1136.8	545.4	129	2709.1	748.3	5420	7777.5	17566.1

Source: Ministry of Irrigation

Off-farm water conveyance efficiency of most canals is around 50%, except for Euphrates-Aleppo Basin where conveyance efficiency is in the range of 60-70% as a result of concrete lined canals. These factors suggest that there is a great potential for improving on- and off-farm WUE through the application of appropriate irrigation system, use of modern irrigation technologies such as drip and sprinkler irrigation, land levelling, and construction of lined canals or conveyance through pipeline connections from dams to farm gates. These improvements are made to meet water resource deficiency estimated at 3348 m.m^3 as shown by tables 2 and 4.

INSTITUTIONS RESPONSIBLE FOR WATER SECTOR IN SYRIA

In Syria, the water sector is managed by several institutions and ministries with slight overlapping in responsibilities:

- Ministry of Irrigation (MoI): MoI and its directorates in the provinces are responsible for water management and development together with routine monitoring of surface and groundwater quality and water provision for irrigation purposes.
- Ministry of Agriculture and Agrarian Reform (MAAR): it is in charge of the economic use for irrigation purposes in the agricultural areas, including the search for modern techniques that reduce water losses and growing low-water consumption and salinity-tolerant crops.
- Ministry of Housing and Construction: in charge of supplying the rural and urban areas with drinking water as well as wastewater treatment plants.
- Ministry of Environment and Local Administration: in charge of monitoring water quality and developing the criteria necessary for water resource protection.

Each of the above mentioned Ministries has a number of representative directorates at province or basin level. For example, MoI has General Directorate of the Basin & Directorate of Wastewater Pollution Control in each province. Ministry of Environment has specialized directorates for water protection and waste management. Ministry of housing, in all Syrian provinces, has General Companies for Drinking Water and Sanitation. The same is for the General Company for Sewage Water.

POLICIES AND PROCEDURES FOR ATTAINING SUSTAINABLE DEVELOPMENT OF WATER RESOURCES

Due to the importance of WRs and for their conservation from deterioration and depletion, the government, along with the construction of dams and the establishment of irrigation projects, has taken a range of measures to attain the sustainable development of WRs:

1. Assessment of water sources: this is done to prepare new water budgets showing water movement direction and hydro-chemistry; explore deep aquifers and explain groundwater recharge and discharge.

2. Development of an overall water plan; this plan aims at:
   - Identifying current and future uses until the year 2025.
   - Collecting, treating and reusing non-conventional water (wastewater – drainage water, and others).
   - Monitoring water quality and quantity.
   - Developing programmes for training and qualification.

3. Development of an overall research plan to improve WR management and on-farm use rationalization, an overall research plan has been worked out and implemented in late 1980s. This plan has been also developed to include five research programmes: programmes on modern irrigation methods and technique research as compared technically and economically with traditional irrigation of all irrigated crops. It was possible to get results that formed the scientific basis of government's resolutions in the implementation of the national programme on transfer to modern irrigation in most irrigated areas.

4. Utilization and maintenance of irrigation projects:
   - Giving attention to exploitation and maintenance in terms of provision of necessary equipment and staff.
   - Developing and rehabilitating the old irrigation projects.

5. Water use rationalization: this is attained by:
   - Applying scientific research results to reduce losses in on-farm water distribution systems using advanced irrigation techniques.
   - Selecting good lands and applying appropriate irrigation techniques and crop rotation by soil quality and properties.
   - Stopping violations and encroachment on water structures.
6. Modernization of water legislation and institutional system aiming at:
   - Optimal management of WRs for several activities.
   - Discussions on water use rights and water protection from pollution.
   - Keeping pace with technological advance and its reflections on WRs.

7. New Water Legislation: Presidential resolution No 31 dated 06/11/2005 was passed by the Peoples Assembly, including 12 chapters and 58 articles and covering: definitions, water structures, public water and property rights, state irrigation systems, well-drilling licenses, public water pollution control, violations and penalties, water policy, WUAs, and technical and administrative aspects.

8. Developed water legislation: Presidential Resolution No 31 dated 06/11/2005 was developed and adopted by the Peoples Assembly after it had been studied for a long period by relevant technical, legal, legislative and scientific committees, in order to avoid gaps made in last legislation and setting controls for water usage and water structure protection. This resolution included 58 articles, distributed to 12 chapters.

9. General Commission for Water Resources: this Commission was established according to the government orientations towards improvement of water resource management and development in Syria, based on Legislative Decree No /90/ passed by the President on 29/09/2005.

WOMEN'S ROLE IN WATER RESOURCE MANAGEMENT

The Syrian Government has fully recognized water scarcity as the top priority. Accordingly, several decrees were issued to move to the adoption of modern irrigation technologies seeking the achievement of rational water use. The integration of women in all aspects of the development process has also received considerable attention in all national events. Nevertheless, women's participation in conservation and development initiatives is often affected by their insufficient decision-making power within the household, the farm, and the community.

General Conditions of Syrian Women

The Syrian government has recognized the necessity of improving women's lives and integrating gender issues as fundamental indicators in the governmental projects and development programmes to be implemented in the forthcoming 5 years. Consequently, the process of involving women in the economic, social and political life has definitely accelerated in the past 5 to 10 years (Syrian Commission for Family Affairs, 2006). Aiming at achieving a higher level of gender equitability in the general budget, policies and programmes were implemented, recommendations were issued by the economic committee No 26 in 2004 to allocate 0.25 of the investment to different public ministries and administrations especially to support women's activities and rise up their contribution to the development process. Table 5 summarizes the legal amendments and new gender reforms with positive effects on Syrian women that took place in the period 2000-2005.

Table 5. Legal amendments and new procedures (2000-2005)

Date	Subject
2000	Amending provisions of Law No. 91/1959 to prohibit employment of kids under 15 years old.
2001	Amending Agriculture regulations Law No. 134/1958 to prohibit using kids under 15 years old in agricultural work. Incorporating a section of the 9th five-year plan for women issues.
31 December 2001	Women employees became entitled to pension at the age of 55 if they completed 15 years of services or at 50 if they completed 20 years (Article 9 A&B). A new (Article 22) was added to Law No. 92/1959 under Article 35 of the Law. Pursuant to the new article, pensions of insured employees will be inherited by their legal heirs.
2002	Merging elementary and secondary schools as one stage of the educational system (Basic education) which is free and mandatory with same enrolment conditions for both sexes.
13 may 2002	Extending the paid maternity leave to 120 days for the first child, 90 days for the second one and 75 days for the third one.
10 August 2002	Ratifying the agreement on establishing the Arab Women Organization signed in Cairo on 15.07.2002.
September 2002	Ratifying the convention of eliminating all types of discrimination against women (CEDAW).
2003	Amending Legislative Decree 143/1952 concerning family allowances.
20 December 2003	Establishing the Syrian Commission for Family Affairs.

31 December 2003	Amending article 19 of Law No. 134 to give mothers custody over their kids until the boy is 13 and the girl is 15 years old.
2003	Women representation in the Parliament increased from 10 to 12%.
2005	Amending basic work law and canalling the article stipulating arbitrary layoff. Amending the agriculture relations law to give more security to women working in agriculture. Incorporating a chapter for enabling women into the 10th five-year plan. Another chapter for housing issues and a third one for the North-Eastern region in addition to a section for human rights in the plan.
2006	Appointing Dr. Al Attar as the first woman as a vice President.

Source: Syrian Commission for Family affairs, 2006.

In consequence, results of the new amendments have positively influenced women's employment rate in the governmental ministries and institutions reaching 32.64% of the total out of which 24.29% are working in the Ministry of Agriculture and 9% in the Ministry of Irrigation (Table 6).

Table 6. Female workers at some governmental institutions

Ministry	Females	Total	%
Agriculture	17619	72531	24.29
Irrigation	2912	31736	9.18
Local administration & environment.	9216	66344	13.89
Total workers at governmental ministries	336785	1031688	32.64

Source: CBS, 2006.

The process of women's development has shown quite tremendous progress represented in the improvement of the main development indicators. In the social life, fertility rate decreased from 4% in 2000 to 3.6% in 2005. Mortality rate decreased from 65.4 per 100000 in 2000 to 58 per 100000 in 2005. And female illiteracy rate was 26% in 2005, male illiteracy 12% of the total population above 15 years (Table 7).

Table 7. Indicators of women development between 2000 and 2005, with projections up to 2015 as proposed in the Syrian National Population Strategy

Indicator	2000	2005	2015
Population growth rate	2.69	2.45	1.90
Life expectancy	71.3	72.1	80.2
Fertility rate	3.7	3.5	3.00
Mortality rate among infants (per 1000)	24	17	11
Mortality rate among children under 5 years (per thousand)	26.00	19.3	13.9
Mortality rate among mothers (per 100000)	71	58	32
Illiteracy rate	26.3	22.4	
Unemployment rate	22.00	12.3	8.00
Poor (males & females) of total population	20.56	11.4	7.1
Participation in the economic production	12.7	9.2	15.0
Participation in the Parliament	10.4	12.0	25.22
Participation in the ministries (%)	7	7	15.00

Source: Syrian Commission for Family affairs, 2006

Women's participation in the Parliament increased from 10 to 12% and Syria acceded to the "Convention on the Elimination of All Forms of Discrimination against Women" (CEDAW) on March

23, 2003. In the same year, the Syrian Commission for Family Affairs and many other women's NGOs, were established in the aim of activating Syrian women in the economic life. An example was the establishment of "FARDOUS" and "Mourid" in 2001 for women's development aiming at their self dependence in order to enhance development in rural communities. These organizations promote the potential role of women in the agricultural and rural development.

Women's Role in Agriculture

Agriculture in Syria constitutes an important sector of the country's economy, accounting for about 24% of the gross domestic product (GDP) and 20% of export earnings. The agricultural sector employs around 25% of the labour force and meets a great part of the need for food and raw materials for agro-based industries (CBS, 2006). In Syria, about 50% of inhabitants live in rural areas, and half of them are women who represent the major contributors to four sub sectors of the rural economy: crop production, livestock production, food processing and household and family maintenance. In 2005, the number of women working in agriculture amounted to around 58.7% of the total female labour versus 26.5 of the total male work. Rural women contribute to 70% of agricultural activities (weeding, harvesting, grading, and sorting), and other tasks that require much more patience, while their role is decreasing in the marketing process (only 0.5% of cases); marketing is in most cases a male task. All family members participate in harvesting but women play a major role in some post-harvesting activities, especially food processing. They play a very important role in the management of fruit trees plantation particularly pruning, treating, watering and harvesting. Women are also responsible for vegetable production which takes place in gardens close to their house.

Dairy production and processing mainly involve women, whereas men handle marketing and loan provisions. Women's participation rate is higher in animal cow/sheep production like animal watering, cleaning stables, feeding, but it is lower in activities such as buying forage, sheep herding, animal marketing, wool sheaving, and taking care of new born animals. Women daily water and feed the animals and may also graze and milk them. However, when flocks and herds need to be taken to pasture, the young men or children are more likely to be involved. Women are always responsible for poultry and processing of products from livestock, especially dairy products.

According to a field survey carried out in 2002 by the Ministry of Agriculture, FAO and IFAD, women's participation rate was as follows:

- Ploughing: 2-3%
- Seeding and planting: 13-28%
- Irrigation: 7.5-13%
- Weeding 52-73%
- Control and fertilization: 2-6%
- Grafting and pruning 0.6-2%
- Harvesting and picking off: 43-66.5%
- Marketing 0.4-7.5%

Women's contribution to weeding and harvesting ranks the first followed by seeding and planting, then irrigation which depends on men because irrigation needs hard work and at most times done at night (GCSAR, 2002).

Women's Role in Irrigation

In addition to women's labour in agriculture, they play a significant role in food production and in achieving household food security. They particularly contribute to 7.5-13% of the irrigation practices like operating the pipe lines and moving them between trees or switching on and off the panels (FAO, 2005). At household level, women collect water usually from far distances for drinking and cooking and other housework and they succeed in keeping the levels of the household water requirements. Therefore, women play an important role in rational water use in order to ensure the household water security. For instance, they usually reuse water for other purposes and in different ways. Raising

awareness towards water resource management should always start with women at household and farm levels.

Institutions involved in women's development

- Ministry of Agriculture and Agrarian Reform (MAAR): operating through central and governorate directorates. All relevant Ministerial Central Directorates are represented at Governorate level by Divisions; the Directorate of Agriculture and Agrarian Reform (DAAR) has the responsibility of developing the agricultural sector in the Governorate. At district level, a District Sub-directorate of Agriculture is usually run by a staff member of the Directorate of Agricultural Affairs. Usually there are one or more village agricultural extension units in each district constituting the front line of the MAAR. This administrative organization allows the Directorate of Agricultural Extension (DAE), which has an office in each governorate, to operate at three levels: national, governorate and village. One of the divisions of DAK is the Women Development Division which helps preparing programmes for rural women's development in the fields of nutrition, child-care, sanitation, home economy, domestic animal care and supports literacy and family planning programmes.

- General Union of Women (GUW): it is a semi-autonomous organization operating throughout the country supporting women's empowerment. It is omnipresent and the representation is at governorate, branch and unit levels. There are several branches by governorate and each is run by a permanent wage earner assisted by volunteers. Each branch is organized by themes: technical and craft training, organization, information, medical services, health awareness, education, literacy. Each unit can range from 20 to 500 women. There are 3463 centres and 863 in rural areas. Training courses are dispensed in centers but also in villages according to the requests.

- Ministry of Social Affairs and Labor: its action takes place through Rural Development Centers spread over the country. Each centre contains three units which are under the technical responsibility of different Ministries: agricultural (MAAR), social (Social Affairs) and medical (Health). The main activities women carry out in these centres are literacy, home economy, kindergarten and carpet making. Participants follow a six-months training course. In general, the income is low compared to the difficulty of the task. Most employees have a low education level, are young and single women coming from poor families and who will leave their job once get married.

CONCLUSIONS

- Limited Syrian water resources as compared to the increasing demand by different economic sectors.
- The agricultural sector is the largest consumer of water resources.
- Syrian government's attention to water resources considering them a natural resource that should be saved in order to meet the necessary needs by constructing dams and fulfilling irrigation projects.
- Increase in water loss due to: evaporation, low-efficient traditional irrigation on 80% of irrigated areas, and the use of earth canals in on-farm water distribution (quadric canals).
- The necessity to rehabilitate old irrigation projects and develop modern ones by transferring them to piped canals in conveyance and distribution, conducive to the use of modern techniques in on-farm irrigation.
- Adoption of a range of measures and polices by the government, aiming at the sustainable development of water resources and the orientation towards the establishment of WUAs and the activation of the existing ones.
- Establishing and supporting scientific research centers working in the field of water management improvement.

- Taking a range of legislative and institutional measures conducive to water saving and rational management, including the development of water legislation that fully supports the establishment of WUAs.
- Establishing the General Commission of Water Resources and the Directorate of National Programme for Movement to Modern irrigation.

Regarding women's issues and despite the gains and rights that Syrian women have achieved so far, they have still long track towards achieving development comparing to other developing countries. Women's development is still suffering from many constraints:

- Women's power and their daily working hours are accounted in the national income statistics, especially the informal work like housekeeping and the agricultural work on the family farm.
- Women can rarely have access to some resources and advantages, as well as to market due to the traditional gender role which led to tangible gender gaps that concern the economy, education, health, and the access to other services. Rural women face several constraints above all as regards habits and traditions, and the heavy activities linked to production are mostly unpaid and not restricted or reported in the national statistics. They also suffer from inequality in terms of land and water resource ownership and of market access. In addition to that, they are not involved in the programmes of extension courses and technology, credit services.
- Discriminatory laws, policies and practices still hinder women's access to production resources such as land, water and institutional support.
- Moreover, they are not involved in decision-making and programme planning. The consideration of gender issues in agriculture and rural development especially as regards the health and welfare of family members, food security and the relevant impacts on the national economy, or environmental and gender discrimination in terms of poverty is represented by the heavy burden undertaken by women in water consumption management under scarcity circumstances. Women's involvement in water resources management is not only important to improve their status but it is also essential for an effective use of the very finite water resources for present and future generations. Therefore, rural women should improve their skills through training in new agricultural techniques and in the field of household economy.
- Only 0.5% of women in the informal market are running their own businesses, while 11% of them are workers, 32% are wage workers whereas, 56.2% are unpaid working in the family business. Most of them (76.9%) earn less than 4000 Syrian Lira per month.

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