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HARMONIZATION AND INTEGRATION OF WATER SAVING OPTIONS CONVENTION AND PROMOTION OF WATER SAVING POLICIES AND GUIDELINES

A. Kaisi*, Y. Mahrousa* and Y. Mohammad*

*MAAR – GCSAR, G.U.P, Ministry of High Education, Damascus, Syria

WATER RESOURCES, WATER USE AND WUE IN SYRIA

Table 1. Water resources (surface and groundwater) in Syria

Water source		Hydrological basin							Total
		Barada & Awaj	Yarmouk	Badia	Orontes	Coastal	Tigris-Khabour	Euphrates-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

Table 2. Available WR 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

Table 3. Development of irrigated agriculture by water source

Year	Surface water-irrigated area (x 10 ³) ha	Groundwater-irrigated area (x 10 ³) ha	Total irrigated area (x 10 ³) 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

GUIDELINES OF POLICIES AND MEASURES FOR ATTAINING SUSTAINABLE DEVELOPMENT OF WATER RESOURCES

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.

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 programs for training and qualification.

Utilization and maintenance of irrigation projects

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

Water use rationalization

This is done through:

- 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 infringement on water structures.

Development of an overall research plan

This plan has been also developed to include five research programs: programs on modern irrigation methods and techniques research as compared technically and economically with traditional irrigation on all irrigated crops.

Technical results of the research plan

a. Results of research centers:

- Sprinkler irrigation on strategic field crops (cotton, wheat, sugar beet and maize) has led to:
 - Irrigation water saving averaged 40%.
 - Yield increase averaged 37%.
 - WUE increase from 0.38 – 2.42 kg/m³.
- Localized irrigation on different farmings including fruit trees and excluding wheat:
 - Irrigation water saving averaged 48.5%.
 - Yield increase averaged 35.7%.
 - WUE increase from 0.86 – 3.5 kg/m³.
- Improved surface irrigation on strategic field crops has led to:
 - Irrigation water saving averaged 29%.
 - Yield increase averaged 26%.
 - WUE increase from 0.38 – 1.89 kg/m³.

b. Results of demonstration plots and farmers' fields

A number of farmer fields using modern irrigation techniques were put under extensionists and irrigation specialists' supervision, control and following-up

- * Sprinkler irrigation has led to:
 - Irrigation water saving by 31%.
 - Yield increase by 27.7%.
 - WUE increase from 0.31 – 1.1 kg/m³.
- * Localized irrigation has led to:
 - Irrigation water saving by 45%.
 - Yield increase by 32%.
 - WUE increase from 0.31 – 1.24 kg/m³.
- * Improved surface irrigation has led to:
 - Irrigation water saving by 22%.
 - Yield increase by 25%.
 - WUE increase from 0.31 – 0.58 kg/m³.

Modernization of water legislation and institutional system

With the aim of:

- Optimal management of WRs for several activities.
- Discussions of water use rights and water protection from pollution.
- Keeping pace with technological advance and its reflections on WRs.

New 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.

General Commission for Water Resources

Responsibilities:

- Management, development and protection of WRs in the seven hydrological basins in Syria.
- Supervision on utilization and monitoring of WRs and water structures in hydrological basins all over the governorates.
- Coordination between Ministries of Irrigation and Housing for assessing drinking water sources and utilization of treated wastewater.

GOVERNMENT MEASURES FOR ON-FARM WATER MANAGEMENT IMPROVEMENT

Transfer to modern irrigation

Concerned ministries (MAAR – MoI – Industry – Economics...) were commissioned to undertake the following measures:

- Planning of irrigation areas according to the renewable water.
- Preparation of studies for the rehabilitation of old state irrigation projects, in line with the use of modern irrigation techniques.
- Determination of transfer requirements and provision of loans for funding all requirements.
- Preparation of studies necessary for establishing communal irrigation projects on wells.
- Free preparation of studies and designs of modern irrigation networks for farmers.

Directorate of the National Project of Movement to Modern Irrigation

- a. Based on Minister of Agriculture's resolution No /26/ on 19/05/2005,
 - Prepare and supervise studies, designs and technical books of conditions necessary for the project beneficiaries' field irrigation networks;

- Supervise the provision of loans from the special fund of beneficiaries financing;
- Coordinate with relevant institutions (MoI – Industry – GCSAR) to formulate plans necessary for project implementation; and
- Deepen the concept of water extension and participatory irrigation by adopting different training levels and conducting training course on modern irrigation for technicians, extensionists or farmers.

A fund for financing the national project of transfer to modern irrigation

Depending on the legislative decree No /91/ approved by the President on 29/09/2005, a fund was established at MAAR to finance transfer project at a capital SP 53 billion to be recovered during five years

Those who invest in agriculture whether they are owners, leaseholders, beneficiaries or farmers can benefit from this fund through free-interest ten-year loans to be recovered by equal annual payments.

Higher Committee of Transfer to Modern Irrigation

With the purpose of scientific and smooth implementation of the national programme and to iron out the difficulties encountered. He is responsible to approve the annual plan and follow-up on implementation of the national programme and the annual plan of the special fund of project financing.

Water Users Associations (WUAs)

Historic overview

- The first water users society in the modern age in Syria is dated back to the year 1928 when Al-Breika farm in Rural Damascus was established as a cooperative project for groundwater drilling.

Present situation

The government orients toward the promotion of WUAs by releasing appropriate laws and resolutions to:

- Identify water beneficiary structure;
- Identify WUAs role in water distribution; and
- Identify WUAs role in project maintenance.

A full chapter in the new water legislation was assigned to WUAs including several items addressing WUAs establishment, structure, mandate, management and their role in water and irrigation system management and participation in decision-making and implementation.

Awareness and technology transfer programmes

Awareness programmes

Ministry of Information gives great attention to development media, so that a special directorate of development media was established to follow-up on the development information plans on population and environment in coordination and collaboration with government, popular and international bodies and organizations.

Technology transfer and water awareness dissemination programme

Several activities on awareness dissemination and identification of modern irrigation advantages have been undertaken as of the second half of 2000 up to date including:

- Organizing /853/ seminars and 324 field days, attended by /54692/ extensionists and farmers from irrigated areas in Syria.

- Conducting /230/ training courses, attended by /33490/ technicians and extensionists.
- Free designing and checking irrigation systems for farmers on an area exceeding /42600/ ha.
- Providing /50/ free irrigation network for the winning cotton-growers, covering 2 ha each.
- Equipping /150/ farmer fields with modern irrigation inputs (drip – sprinkler) for farmers via collaboration with international organizations.
- Implementing laser land-leveling for more than 1500 ha of cotton and sugar beet, aiming at disseminating awareness on surface irrigation development.
- Printing /25000/ fliers on the advantages of modern irrigation and distributing them to farmer societies and centers.

Pilot projects on the participatory use of water resources in agricultural sector

On-going projects:

a. Abu Kalkal project in Aleppo:

- This project was implemented through Spanish expertise and funding with the help of national staff..

b. Orontes basin project in Hama

- Project studies and designs were prepared by the national staff and funded by FAO. Number of beneficiaries was 13 farmers

c. Participatory irrigation project in Irneh/Rural Damascus

This project depends on the participatory use of groundwater for irrigating fruit trees (apples) by localized irrigation (drip). This project was locally funded and nationally studied and designed.

Under-implementation projects:

Optimal community based-management of surface water resources for agriculture in WANA region, in collaboration with ICARDA during 2005 – 2007 project

Development of efficient irrigation techniques and agricultural extension in Syria project

Communal Management & Optimization of Vallerani System Micro-catchment Water Harvesting for Combating Desertification in the East Mediterranean Region

Rationalization of Irrigation Systems in Ras Al-Ein area - Hassakeh

- This project is executed in collaboration with the Italian side – General Directorate for Cooperation and Development. It is funded by MAIB – Bari institute at a grant € 2.3 million and development grant at € 9.3 million. MAIB – Bari institute also

CONCLUSIONS

In the light of growing pressure on water resources by all economic sectors and since agricultural sector is the largest consumer of water resources (1410 million m³), the government options on water provision are typified by the following:

1. Establishing and supporting the scientific research centers working in the field of water management improvement.
2. Taking a range of legislative and institutional measures conducive to water saving and rational management, including the development of water legislation that fully support WUAs establishment.
3. Establishing The General Commission of Water Resources and the Directorate of National program for Movement to Modern irrigation.
4. Cooperating with international institutions and organizations to implement pilot demonstration research projects with the aim of disseminating modern irrigation techniques via water education and technology transfer programs.