



Local
actions
for a
global
challenge

SESSION REPORT

TITLE OF THE SESSION

FT4.16 Water Use Efficiency in Agriculture and Potentials for Water Saving in the Middle East Region

SESSION CONVENERS

Prof. Dr. Atef HAMDY, CIHEAM – Mediterranean Agronomic Institute of Bari, Italy.
Dr. Patrice BURGER, Programme Solidarité Eau Méditerranée, France.

KEYNOTE SPEAKERS

Prof. Atef HAMDY, Emeritus Professor Land and Water Resources, CIHEAM – Mediterranean Agronomic Institute of Bari, Italy.

Dr. Nicola LAMADDALENA, Head of the Irrigation Department, CIHEAM – Mediterranean Agronomic Institute of Bari, Italy.

Prof. Netij BEN MECHLIA, Professor, Institut National Agronomique de Tunis, INAT, Tunisia.

Prof. Redouane CHOUKR-ALLAH, Head of the Salinity and Plant Nutrition Laboratory, I.A.V. Hassan II, Agadir, Morocco.

Mr. Abdus.salam KAMAL, Water Demand Management Specialist, Jordan.

CONVENORS GENERAL REMARKS ABOUT THE SESSION

(Scope of the problem or situation)

Water represents one of the major factors of economic development in the most arid and semi-arid countries and especially in the Middle East and North Africa region. In this region, population growth is among the greatest in the world (up to 3.5%) and agricultural production, and, therefore, food security, relies almost completely on irrigation (UN Population Division, 2001). Nevertheless, the fresh renewable water resources are the lowest in the world (in average about 1250 m³/capita/year), and in

many areas are already below 1000 m³/capita/year, a threshold indicating chronic water stress (World Bank, 1995; Abu-Zeid and Hamdy, 2002).

In the Middle East and North African countries, the lion's share of total annual water withdrawal, in average about 89%, is directed to irrigated agriculture with the overall efficiency below 50% (FAO, 2002; Abu-Zeid and Hamdy, 2002). The projections of food and water demand in the region indicate further population increase with the corresponding increase of water demand. However, existing situation is not amenable to cope with the increases in food and water demand due to water and land shortage. Furthermore, in the future, water could be increasingly allocated to other users instead of agriculture. Therefore, the solution for water shortage problems should be searched not in the increase of water input for agricultural use but in a better employment of already existing natural resources, i.e. in the improvement of water use efficiency and implementation of water saving practices throughout the whole water path: from location where it is captured, during its delivery to the irrigation fields and on-farm scale where it is effectively applied for agricultural use.

These aspects, embracing the technical, economic, social, environmental, institutional and political concerns, will be fully covered within the frame of the Special Session on "***Water Use Efficiency and potentials for water saving in the Middle East Region***".

SYNOPSIS

(Brief description of the session, key issues)

The session will focus on the major technical and non-technical solutions of the water demand management that can be used in order to overcome the already existing severe water scarcity, through the presentation of the RAP-WRM project (Regional Action Programme, "Water Resources Management"), its objectives and its outputs, in addition to a case study about the impact of water efficiency programmes on Jordan's water demand.

In fact, the session will be conducted as follows:

- 1) A brief description of the RAP project, its objectives, activities, management, outputs and results, allowing water saving in the irrigated agriculture.
- 2) A non-technical issue of water demand management: the irrigation management transfer and participatory irrigation management and its impact on the performance of the irrigation network under the management of the local users.
- 3) Water saving through deficit irrigation and its impact on crop yield.
- 4) The use of non-conventional water use (especially the treated wastewater) as a freshwater saving solution and its impact on crop growth and productivity, the soil, the groundwater, the profitability and the health hazards related with the use of such water.

- 5) Finally, a case study from Jordan, one the most water scarce countries of the Middle East, on the impact of water efficiency programmes on water demand.

LOCAL ACTIONS PRESENTED DURING THE SESSION

(Brief description of the local actions presented – scope, impact of the local actions, type of stakeholders involved, originality and innovative ideas, etc.)

Assess the actual situation of research and agricultural practices related to the water use efficiency and water productivity in the Middle East region and to address the potentials and opportunities for water saving in irrigated agriculture throughout the whole "traveling path" of water from the source to the consumer on the field. A particular attention will be given to the consideration of the whole spectrum of sustainability aspects of water use efficiency and to the integrated strategies and actions involving different profiles of stakeholders from the farmers to water managers and politicians.

LESSONS LEARNED

(Brief description of the most important lessons learned)

- 1) A continuous water restriction (deficit irrigation) seems to give a better yield than restrictions during just the vegetative growth phase or during the final fruit growth stage, allowing 33% of freshwater saving and resulting in just 10% yield losses, while improving the production quality (sugar content and dry weight of fruits).
- 2) The use of new technology for the delivery system (ACQUACARD) improved the performance of the water distribution network, allowing irrigation only during the night when discharges are lower than 200 l/s in the pilot area.
- 3) Yields were doubled for almost all plants when irrigated with treated wastewater (tomato, maize, green beans ...), with a reduction, at the same time, of the fertilisers input (an equivalent of 350 Euro/ha) and nitrate concentration in the groundwater is reduced by 70% when sewage water is treated before used for agricultural purposes.
- 4) New strategies to overcome negative effects of the use of non-conventional water resources should include an appropriate crop rotation with the crops of different salt tolerance degree.
- 5) There is a high potentiality of using drainage water successfully in irrigation assuring the presence of a good quality water source to meet the leaching requirements and to be alternated with the low quality one according to the salt sensitivity of the crop growth stage; freshwater saving could reach values of 60 to 70%.

- 6) The process of development of water users associations is going on, but requires time and support of different agencies.
- 7) Saline irrigation water can safely be used for irrigation of cereal crops in the Mediterranean region because of the effective winter rainfalls, which leach the salts out of the root zone as long as efficient natural or artificial drainage system is provided.

KEY MESSAGES

(Orientations for future actions, policy recommendations, commitments)

- Integrated water resources management: demand water management, particularly in the agricultural sector where there is a very high potentiality of water saving to satisfy the increasing water demand in the other sectorial uses.
- Water productivity improvement fundamentally based on using new technologies to achieve higher production efficiencies through water conservation technologies, intensive irrigation of high values crops, expanded supplemental irrigation in rainfed agriculture and improved irrigation methodologies.
- Re-use and recycling of wastewater in the agriculture sector as it is the most reasonable approach to save a part of freshwater already allocated to agriculture and above all to sustain the environment without degradation.
- Promotion of research and communication of scientific and technical information in the field of water resources management and irrigation practices to improve crop water productivity and water use efficiency and subsequently a better water saving and reducing water losses,
- Providing the decision makers with a technical and socio-economic supporting aid concerning water planning and strategies.
- Closer participation and collaboration of the technical groups and the involvement of farmers in the implementation of the programme.
- Capacity building and empowerment activities to enable stakeholders at all levels, both men and women and relevant structures (public, private, NGOs, civil society organisation) to play their role in the process.

ORIENTATIONS FOR ACTION

(Recommendations of the three most relevant future actions)

- Water productivity improvement fundamentally based on using new technologies to achieve higher production efficiencies through water conservation technologies, intensive irrigation of high values crops, expanded supplemental irrigation in rainfed agriculture and improved irrigation methodologies.
- Providing the decision makers with a technical and socio-economic supporting aid concerning water planning and strategies.
- Capacity building and empowerment activities to enable stakeholders at all levels, both men and women and relevant structures (public, private, NGOs, civil society organisation) to play their role in the process.