

# Improved Management of Water Resources in Jordan

## Summary

The current overexploitation of water resources in Jordan poses a serious threat to a sustainable water supply for the population, industry and agriculture. Strong **population growth** and the influx of **refugees** from neighbouring conflict areas are causing an increasingly difficult situation, which is exacerbated by the **impacts of climate change**.

The GIZ 'Management of Water Resources in Jordan' programme is an excellent example of an integrated, holistic approach aimed at the sustainable and efficient use of available freshwater and marginal water resources and a fair resolution of interests between households, industry and agriculture. The programme is not merely technically focused; it also provides educational material for schools, training courses for utility managers and suitable preaching books for imams.

The programme provides strategic, specialist and technical support for Jordan's water institutions, thereby making a key contribution to more efficient water resources management and hence **climate change adaptation**.

The wide scope of the programme is reflected by the following component projects: (a) Improved Water Resources for Low-income Communities; (b) Training for Water and Energy Efficiency; (c) Water Wise Plumbers in Host Communities; (d) Decentralised Wastewater Management for Adaptation to Climate Change; (e) Decentralised Integrated Sludge Management; (f) the regional Sustainable Water Integrated Management (SWIM) project; (g) WASH in Schools (WASH is an UNICEF programme in the area

of **W**ater, **S**anitation and **H**ygiene); (h) Water Cooperation with Religious Authorities and (i) Participatory Resource Management.

The results have been remarkable:

- The water supply for roughly six million people has improved.
- Around 30% of farmers in the Jordan Valley have been trained in using treated wastewater for irrigation farming.
- Irrigation efficiency increased by 20%.

## Challenge

With less than 150 cubic metres of water available per capita each year, Jordan ranks among the world's most water-poor countries. This situation is exacerbated by the impacts of climate change and the in-migration of more than 800,000 refugees. To satisfy the demands of agriculture, industry and people alike seems all but impossible.

## Setup

On behalf of the German Federal Ministry for Economic Cooperation and Development, GIZ is implementing the Management of Water Resources in Jordan programme in partnership with KfW Development Bank, the German Federal Institute for Geosciences and Natural Resources and the Centre for International Migration and Development. Several German companies are involved through development partnerships with the private sector. The programme activities started in 2006 and are on going. Main programme partner on the Jordanian side is the Ministry of Water and Irrigation.

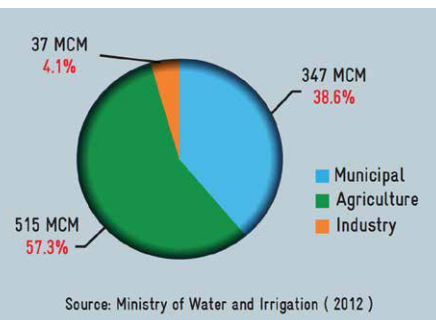
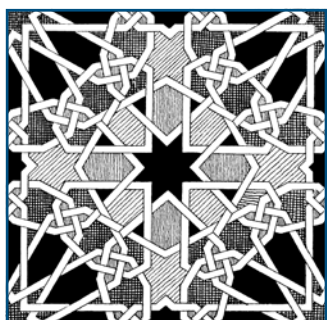


Fig. 1: Water consumption in Jordan by economic sector [in million cubic metres (MCM)/year]



Fig. 2 (l): Tomato cultivation in a plastic greenhouse

Fig. 3 (r): Field day with farmers in the Jordan Valley

## Opportunities

Since 2003, the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), the predecessor of GIZ, concentrated its activities on the safe application of marginal water sources, mainly treated wastewater, for irrigation. GTZ:GIZ pursues the idea that ‘water reuse is Jordan’s option for bridging the gap between water supply and demand’. The majority of Jordan’s water resources is used for agricultural purposes. In the Jordan Valley, farmers increasingly have to use reclaimed water in order to irrigate their fields. The use of treated wastewater, however, requires a certain conduct to assure safe use in order to meet the needs of the crops and safeguard the health of the consumers, and to dissipate people’s concerns. Within the framework of German–Jordanian ‘Management of Water Resources’ programme, **guidelines were developed for the use of reclaimed water** in close collaboration with the Jordanian authorities.

Farmers in the Jordan Valley were trained through workshops on the use of treated wastewater, plant nutrition and soil fertility, as well as on general topics like water scarcity and water conservation in Jordan (Fig. 3).

**Mikhled Mohamed Sulayman Ad-Dayyat**, a father of seven children, had been a truck driver. Now he owns 42 plastic greenhouses in which he grows different crops (Fig. 2). He started the adventure, as he calls it, because ‘the Jordanian farmers are fighters who are always looking for innovations in order to improve their living conditions’. The adventure was worth it: By following the advice he received on fertigation, he was able to reduce the amount of applied fertiliser by up to 60%, which led to an increase in his net profit of around 20%.

The present programme has a much wider scope than the original GTZ project for the following reasons:

- The programme provides strategic, specialist and technical support for Jordan’s water institutions, thereby making a key contribution to more efficient water resources management (Fig. 4).
- The programme is also supporting Jordan’s water utilities as they reduce water losses, compile complete customer and consumption data, take actions to cover costs, train skilled workers and managers, and create more efficient organisational structures and processes.

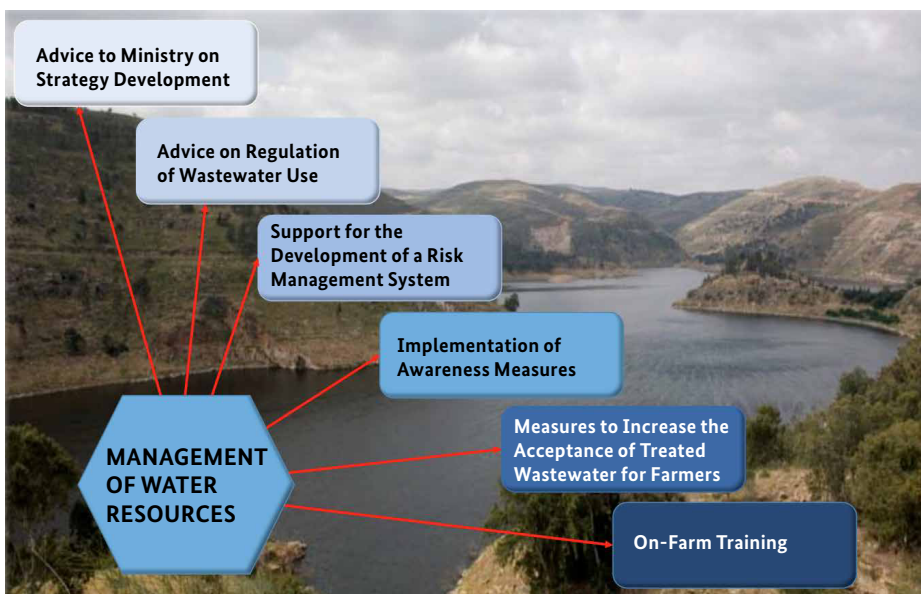


Fig. 4: Intervention levels of the programme (with special reference to wastewater use in irrigation)

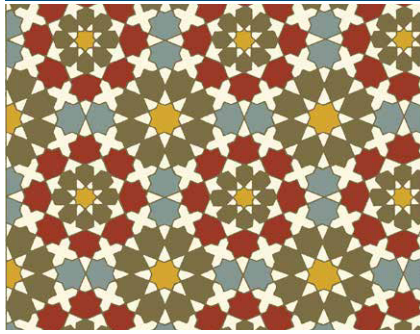


Fig. 5: A core element in planning and training is holistic thinking, e.g. cyclical thinking

- The programme works directly with water users, especially farmers. Farmers receive assistance so that they can use more treated wastewater and deploy more efficient irrigation techniques. Another key objective is to reduce illegal groundwater extraction.
- It supports initiatives such as the Water Wise Women Initiative and the Water Wise Plumbers Initiative, which target a nationwide network of female and male water professionals and enable them to perform repairs in homes and educate communities.
- It supports a variety of other activities to raise awareness on water scarcity and water conservation, such as the Cooperation with Religious Leaders programme or the provision of information material to schools and media.
- The programme presently comprises the following projects: (a) Improved Water Resources for Low Income Communities; (b) Training for Water and Energy Efficiency; (c) Water Wise Plumbers in Host Communities; (d) Decentralised Wastewater Management for Adaptation to Climate Change; (e) Decentralised Integrated Sludge Management; (f) the regional Sustainable Water Integrated Management (SWIM) project, (g) WASH in Schools (WASH is a UNICEF programme in the area of Water, Sanitation and Hygiene); (h) Water Cooperation with Religious Authorities; and (i) Participatory Resource Management.

The 'Best Practices' of four of these projects are incorporated in this 'Digital Chapter'.

### Results achieved so far by the GIZ programme

The results achieved are remarkable:

- The water supply for roughly six million people has improved;
- The partner ministry in Jordan has noticeably improved its management skills as a result of the strategic advice and support in water framework planning;
- Today water utilities are operating as decentralised, semi-autonomous companies with private sector participation in six governorates. The quality and quantity of water provided to roughly six million people has improved (Fig. 5). Private sector involvement has improved water utilities' financial situation and service for consumers, especially in the middle governorates between the north and south of the country;
- The Highland Water Forum, a platform for participatory groundwater management in the highlands, is working to reduce groundwater extraction and make more efficient use of the available water resources.
- Water distribution has become more reliable and farm yields have risen thanks to the establishment of water user associations that now cover about 40% of farmers in the Jordan Valley.
- Scarce water resources are now used more efficiently; irrigation efficiency was raised by 20% and farmers have become more willing to pay water tariffs that cover costs. About 30% of farmers in the Jordan Valley have been trained in using treated wastewater for irrigation farming (Fig. 6).
- In agricultural use, fresh surface water is being replaced more and more by treated wastewater to allow the freshwater to cover urban water demand.

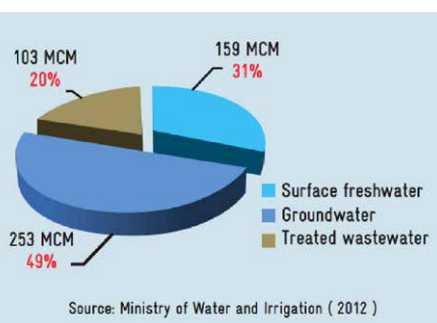
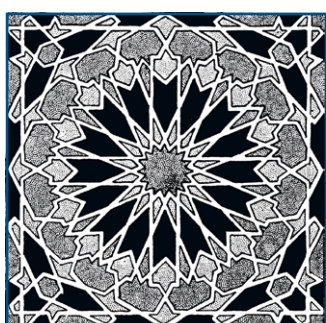
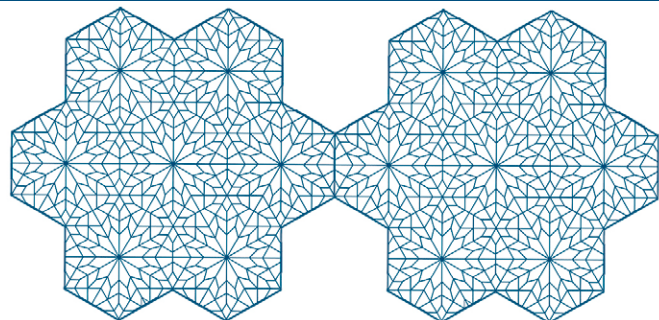


Fig. 6: About 20% of agricultural water demand is now covered by treated wastewater, which is safe for farmers and consumers. This is one of the greatest achievements of the programme



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## Outlook

**Lessons learned:** The major reasons behind the success of the Management of Water Resources in Jordan programme in solving water-related problems in an extremely difficult environment has been its multi-faceted holistic, integrated approach with regard to:

- the different water resources covered (renewable and fossil water, surface and groundwater, rainwater and wastewater, etc.) and the water-energy-nexus;
- the intervention levels (from legal advice down to the field operations);
- the support given (lab equipment, applied research results, guidelines, handouts, technical information leaflets, etc.);
- the care for all three economic sectors (domestic, industry, agriculture) alike;
- raising awareness on water among school children, ordinary men and women, religious leaders, refugees, etc.;
- the coupling of water management with professional training and job creation (example: Water Wise Plumbers).

Another reason for the success is definitely the commitment of all staff members to their work, their ability to cooperate and their readiness to find compromises.

**Transferability:** As far as the transferability is concerned, there are differences to other MENA countries such as:

- Annual precipitation and renewable water resources per capita are less than in most other MENA countries.
- Agriculture uses only 57% of the total water resources in Jordan, whereas municipalities use as much as 39%; these values are quite different in comparison with most other MENA countries (with the exception of Gulf States).
- 97% of Jordanians have access to an improved water source and 93% have access to improved sanitation. This is one of the highest rates in the MENA area.
- The percentage of wastewater collection is also very high and there are a number of wastewater treatment plants delivering treated wastewater of acceptable quality.
- The impacts of climate change are already extreme; Jordan has been a pioneer in preparing climate change adaptation plans.

In general the results achieved by the programme are transferable, or at least well adaptable, to other MENA countries.

**Political decision makers** can learn a lot from this programme's achievements, not least how to optimise the use of scarce water resources and how to adapt society to the consequences of climate change in the water sector and beyond.

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