

Interim evaluation 2008

**Efficient water resource management in
irrigated agriculture in the Jordan Valley
and Highland areas, Jordan**

Brief Report

gtz

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**This report was produced by independent external experts.
It reflects only their opinion and assessment.**

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Tabular overview

The evaluation mission

Evaluation period	July 2008 – November 2008
Evaluating institute / consulting firm	Independent consultants
Evaluation team	Dr. Dieter Mutz Dr. Bassam Hayek

The Development Measure

Title according to the offer	Efficient water resource management in irrigated agriculture in the Jordan Valley and Highland areas, Jordan (Component 2 of the Cooperation Programme "Management of Water Resources, Jordan").													
Identification number	2006.2017.9	Programme "Management of Water Resources, Jordan"												
	2003.2226.3	(Water management in irrigated agriculture (WMIA) - predecessor project)												
	2002.2108.5	(Reuse of reclaimed water in the Jordan Valley (RW) - predecessor project)												
Overall term broken down by phases	2006.2017.9	10/2006 – 09/2015 (9 years) Phase 1: 10/2006 – 09/2009 (3 years) Phase 2: 10/2009 – 09/2012 (3 years) Phase 3: 10/2012 – 09/2015 (3 years)												
	2003.2226.3:	06/2001 – 09/2006 (initially planned until 11/2009)												
	2002.2108.5:	01/2003 – 09/2006 (initially planned until 12/2008)												
Total costs (in EUR)	For the entire programme:													
		<table border="1"> <thead> <tr> <th></th> <th>German TC contribution</th> <th>Jordanian contribution</th> </tr> </thead> <tbody> <tr> <td>Overall term</td> <td>28,000,000.-</td> <td></td> </tr> <tr> <td>Phase 1</td> <td>9,700,000.-</td> <td>1,300,000.-</td> </tr> <tr> <td>Phase 1, Component 2</td> <td>2,469,000.-</td> <td>450.000.-</td> </tr> </tbody> </table>		German TC contribution	Jordanian contribution	Overall term	28,000,000.-		Phase 1	9,700,000.-	1,300,000.-	Phase 1, Component 2	2,469,000.-	450.000.-
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Overall term	28,000,000.-													
Phase 1	9,700,000.-	1,300,000.-												
Phase 1, Component 2	2,469,000.-	450.000.-												
	German TC contribution for the predecessor projects before being merged with the programme in 10/2006: WMIA: 3,682,000 EUR RW: 2,200,000 EUR													

Overall objective and objective for the current phase as per the offer	<p><u>Overall objective of the Water Programme:</u> Governmental institutions (Ministries, VAJ, JVA), operators and farmers manage the water resources in an efficient and sustainable manner</p> <p><u>Objective of Component 2 for the current phase:</u> The efficiency of a sustainable water resource management in Jordanian irrigated agriculture in the Jordan Valley and the Highlands is increased</p>
Lead executing agency	Ministry for Water and Irrigation (MoWI)
Implementing organisations (in the partner country)	for component 2: Jordanian Water Authority (JVA) and Ministry of Agriculture (MoA).
Other participating development organisations	for component 2: CIM, DED, InWEnt, BGR AFD (Agence Française de Développement)
Target groups as per the offer	Entire population of Jordan and for Component 2 specifically the farmers practising irrigated agriculture in the Jordan Valley and the Highlands.

The rating

Overall rating <i>On a scale from 1 (very good, significantly better than expected) to 6 (the project/program is useless, or the situation has deteriorated on balance)</i>	2
Individual rating	Relevance: 1; Effectiveness: 2 ¹ ; Impact: 3; Efficiency: 2; Sustainability: 2

¹ See Annex

Mission: The field mission for this independent evaluation took place from August 31 to September 20, 2008 and involved interviews with stakeholders from related government institutions, farmers and NGOs engaged in irrigated agriculture, both in the Jordan Valley and the Northern Highlands. A significant number of field trips complemented the interviews and the study of the literature and programme documents. The assessment was based on comprehensive terms of reference and on an inception report prepared prior to the mission.

Core problem: Jordan is among the poorest countries worldwide in terms of its water resources. An increasing demand for fresh water to satisfy the needs of the fast growing population is putting continuous stress on the available water resources. Water is presently being used at an unsustainable rate: the annual water demand of 1.000 MCM (million cubic metres) exceeds the available renewable supply of 780 MCM. The difference is covered by over-pumping of aquifers, the use of fossil water sources, desalination of brackish water and the use of treated wastewater. The pressure on water will be further increased because of expansion in different economic sectors and urbanization. This will lead to increased competition for fresh water among the various sectors and end-users. Another basic problem is the lack of a mechanism for regulating the price of irrigation water that reflects the scarcity of the resource. The predicted climate change will exacerbate the problem of water scarcity.

Concept of the Development Measure: The object of this evaluation was Component 2 of the Water Programme called *Efficient Water Resource Management in Irrigated Agriculture in the Jordan Valley and Highland Areas*. The Component is not a stand-alone Development Measure but an important element of the overall Jordanian-German Water Programme (WP). The WP was launched in September 2006 by merging four former individual GTZ water projects. It adheres to an integrated, sector-wide and multi-level approach and includes interventions in water supply, sanitation, irrigated agriculture and the planning of water resources. The WP intervenes on national, regional and local levels.

Component 2 is divided in three Subcomponents, namely (a) participative irrigation management in the Jordan Valley (JV), (b) use of reclaimed water (fresh water mixed with treated wastewater) for irrigated agriculture in the JV and (c) management of groundwater abstraction in the Northern Highlands. Subcomponent (a) focuses on the institutional set-up and developing the capacity of the so-called *water user communities* (WUCs) which are responsible for efficient and fair distribution of the irrigation water in the JV. The WUCs are democratically elected units which represent the farmers in the valley. Subcomponent (b) consolidates and develops the knowledge about the safe and efficient application of reclaimed water, taking into account health risks and international standards for the cultivation of high quality agricultural products. Subcomponent (c) is concerned with reducing

the abstraction of groundwater in the Northern Highlands. For the first two Subcomponents the results chain as outlined in the offer provides comprehensive indicators which are appropriate for the present phase. The results chain for the Highlands shows deficiencies.

Technical implementation: The Development Measure successfully combines different modes of delivery (advisory services, training, study tours) and plays an important role as facilitator of participatory agriculture in the Jordan Valley and – partially – in the Highlands. The spatial set-up of WUCs has enabled the adaptation of traditional forms of water rights to suit the requirements of today's changed social structures. The Component moderates the shift of the responsibility for water distribution from the Jordan Valley Authority (JVA) to the farmers. As a result, the trust between the public and the private sectors has been significantly strengthened. A further result is that fewer complaints of unfair water distribution, as well as reduced damage of the technical infrastructure, have been reported.

As less fresh water is available for irrigation, reclaimed water is increasingly regarded as an indispensable resource for irrigated agriculture and is no longer considered to be a waste product. Farmers are trained to make use of the valuable nutrients in the wastewater, enabling reduced applications of fertilizer, thereby saving money. The use of reclaimed water for agriculture also allows more flexibility in the allocation of fresh water resources for domestic, commercial and industrial use. This Development Measure constantly supported the monitoring of soil, water and crop quality, and initiated a state crop and fruit monitoring programme under the leadership of the Jordanian Food and Drug Association (JFDA).

Lower priority was given to activities in the Highlands. This can be explained by the limited financial and human resources available to the Component 2 and by the very complex and politically sensitive issue of limiting the use of groundwater for irrigation. In spite of these constraints, the Component managed to establish the first water users' community for groundwater management in the Middle East and to form a group at the Ministry of Agriculture (MoA) in charge of developing new concepts for more sustainable irrigated agriculture. In addition, a programme for collecting and interpreting socio-economic data concerning farmers in the Highlands was initiated. As wealthy farmers are influential and the law enforcement for reducing water pumping is weak, a modified multi-stakeholder approach is recommended for this Component of the WP, together with a more prominent role for the Water Authority of Jordan (WAJ).

Partner capacities: The Component was very effective in developing the capacities of individuals (farmers), local entities (WUCs) and relevant sector organizations (JVA, JFDA). At the policy level the Component was not involved at the higher governmental level but

delivered information helpful for national decision-making. The involvement of MoA in capacity development remains below expectations as the Ministry has not yet provided the agreed number of staff and has not yet fulfilled the intended role as advisor to farmers regarding the efficient and sustainable use of groundwater. The Ministry of Water and Irrigation (MoWI), including the WAJ, did only play a minor role within Component 2.

Relevance (rating 1 - very good): The Component is of very high relevance. It is fully in line with the Jordanian water strategy and sets advanced benchmarks for the management of reclaimed water. It also follows the BMZ sector strategy paper for Jordan. Further, the increased understanding of climate change and its impact underline the relevance of the programme in the future.

Effectiveness (rating 2 – good)²: The achievements of the two subcomponents in the Jordan Valley are fully in line with expectations. The concept of WUCs is well accepted, and reclaimed water is not only fully accepted by the farmers as a substitute for fresh water, but its use also brings financial advantages through reduced use of mineral fertilizer. The Highlands Subcomponent is behind schedule, but with the secondment of a CIM expert to the MoA and modification of the concept it can be expected that effectiveness will increase in the near future.

Impact (rating 3 - satisfactory): The project's impact in the Highlands is still limited and does not yet meet with expectations. On the other hand, the impact that has been achieved in the Jordan Valley are notable and fully in line with expectations. Most remarkable is the progress made in the democratic, participatory approach to the formation of the WUCs. The sharing of responsibility between the public and private sectors indicates good governance. The decentralization process has provided opportunities for individuals to participate actively in decision-making processes and to express ideas without being constrained by their status (gender, poverty level, position). The acceptance of the use of reclaimed water as the main water resource for irrigation forms the basis for sustainable agriculture in the JV and paves the way for the development of a comprehensive monitoring and risk assessment programme for fresh fruits and vegetables. It will also help in reducing conflict among the various water users (domestic, agriculture, tourism and industry).

Efficiency (rating 2 - good): The organizational structure of the Component is lean and strongly promotes the development of national expertise in the irrigation sector. The modes of delivery respond in a flexible manner to changing conditions and have been very much appreciated by the counterpart institutions. This good rating also applies to the Highlands

² See Annex

Subcomponent as the reduced output was achieved with a limited input. Cooperation with other German DC organizations has been very constructive and donor coordination is well advanced. Room for improvement is seen in the need for a more systematic link with the other Components of the Water Programme.

Sustainability (rating 2 - good): The Subcomponent of participative irrigation management will be sustainable if there is close monitoring and if cost coverage can be achieved in the long term. The WUCs are not yet mature and need further assistance. The reclaimed water Subcomponent will be sustainable provided that health risks are avoided and that sufficient quantities and quality of reclaimed water are ensured. Public organizations and private enterprises need to be confident that crops cultivated in the Jordan Valley are achieving high quality standards, despite being irrigated with reclaimed water. Ensuring the sustainability of irrigated agriculture in the Highlands is more complex as the Development Measure makes only a limited contribution towards sustainable management of all groundwater resources. In view of the challenges, it is too optimistic to expect sustainable water consumption – abstraction of groundwater not exceeding recharge – within a short period of time. The development of appropriate framework conditions can be considered as a step towards success.

Overall rating (rating 2 – good): This positive rating is based on the combination of high relevance, good effectiveness, efficiency and sustainability, and a satisfactory impact. The Component is embedded in a quite complex environment where the different actors involved have multifaceted interests. However, the Development Measure was implemented transparently and in an unbiased way, keeping its concept intact in an efficient and effective manner. Application of reclaimed water and the promotion of a participatory approach in the irrigation sector are fully in line with the water strategy of the Jordanian government. The Highlands Subcomponent is below expectations; but with the experience gained in the JV and a multi-stakeholder approach, it should be possible to advance in this Subcomponent. Nevertheless, a remarkable improvement will not be achieved within a short period of time as such endeavours need relatively long periods of engagement.

Specific evaluation questions: The Component does not focus on gender issues as there are only very few female farmers. However, there are many seasonal female workers in the agricultural sector and their income is important for the wellbeing of their families. The involvement of women as members of WUCs (even if they are not farmers or farm managers) could help to place the communities on an even more democratic footing.

In some activities, the poor have been sharing in the success. For example, through the WUCs, poor farmers have become able to express their ideas and concerns to the authorities in a more effective manner. In addition, the equitable sharing of irrigation water that resulted from the Development Measure was always appreciated; this was a significant improvement for the poor whose rights had mostly been compromised in favour of the influential. If groundwater extraction is drastically reduced in the Highlands, poor and small farmers might be more affected, as only those farmers might continue to farm who have the financial resources to modernize their farms so that they can increase their crops while consuming less water. This issue has to be considered in future planning, noting that the Component has already started its socio-economic monitoring to create the required knowledge base for decision-making.

Overall conclusion and recommendations: There is a steady increase in water demand but a continuous decline of water availability. The availability of water resources depends also on the water policies of neighbouring countries. Only cross-boundary cooperation will allow sustainable management of water resources that is suited to the regional conditions. The need to satisfy the demand for irrigation, water supply and industrial purposes is causing increasing stress. The hope of some political decision-makers – that the use of fossil groundwater or desalinated sea water will ease or even solve the water crisis in Jordan – must be looked at critically as those measures are either unsustainable or very costly. Closer cooperation and increased exchange of experiences among the different Components of the Water Programme, combined with a stronger focus on water policy development at national level, will help to increase the synergies between the various aspects of water resources management. The consultants recommend that Component 2 of the WP makes the following areas the priority for continuing assistance: consolidation of the WUCs, the institutional reform process of JVA; implementation of a health and safety programme for the use of reclaimed water, adjustment of tariffs for irrigation water, sensitization of decision-makers and the public on groundwater abstraction and launching a stakeholder dialogue on groundwater use in the Highlands.

Recommendations beyond the present scope of the Development Measure are related to transboundary cooperation and coordination in the water sector, the new approach of defining wastewater quality in terms of most appropriate reuse, the monitoring of new contaminants, the option for applying economic instruments for optimizing water use, the challenge of climate change, and the use of life cycle assessment as a decision-making tool in the water sector.

Annex: Objectives and Indicators of the Programme (according to the proposal): Target-performance comparison³

Overall Objective
Governmental institutions (Ministries, WAJ, JVA), operators and farmers manage the water resources in an efficient and sustainable manner.

Indicator 1:
Cost recovery (operation and maintenance costs) in water and wastewater services increased by 10% above the audited result of 2006

Indicator 2:
Water allocation in the various sectors (irrigation, industry, drinking water) is carried out in accordance with the provisions of the National Water Master Plan (comparison; plan stipulation with actual allocation)

Indicator 3:
The extraction rate of renewable groundwater resources in the highland is decreased by appr. 13 MCM/year (from appr. 430 MCM/year in 2004, resp. 420 MCM/year (as corrected by MWI in 2006) to appr. 365 MCM/year, ref. NWMP).

Indicator 4:
Increase in the safe use of treated wastewater in irrigation from 14% in 2004 to 20%.

Indicator 5:
A study confirms that women are taking on a more significant role in awareness raising in relation to water use, saving water and aspects of health and hygiene (comparison with baseline study from 2006)

Phase-related objective of component 2



Programme objective, component 2
The efficiency of a sustainable water resource management in Jordanian irrigated agriculture in the Jordan Valley and the Highlands is increased.

Indicator 1:
Increase of the number of farmers who use marginal irrigation water (brackish and blended treated water) in accordance with the elaborated national guidelines, from 0 in 2005 to 500 (out of a total of 3000 farmers).
Positive: Degree of target achievement 500 farmers (09/2008)

Indicator 2:
Increase in the proportion of irrigated areas in the Jordan Valley that are managed by water user association, from 40% in 2005 to 70%.
Positive: Degree of target achievement 65% (09/2008)

Indicator 3:
The extraction rate of renewable groundwater resources in the highland is decreased by appr. 13 MCM/year (from appr. 430 MCM/year in 2004, resp. 420 MCM/year to appr. 390 MCM/year, ref NWMP).
Indicator is formulated for a higher level (level of indirect benefit). The indicator is difficult to measure resp. not possible to link it directly to the development measure

³ The target-performance comparison is done for component 2 of the water programme only (object of the interim evaluation). The overall objective of the programme and its indicators are listed for a good understanding of the overall context. Indicators with relevance for component 2 are marked with shaded lines.

Summary of evaluation results:

Positive target achievement:	02
Negative development:	0
<u>Indicators not valid:</u>	<u>01</u>
Total of Indicators:	03