Tunisia: Irrigation of the lower Medjerda Valley and Ras Djebel

Ex-post evaluation

OECD sector	31140 / Agricultural water resources	
BMZ project ID	1984 65 353 Investment 1984 70 239 Complementary measure	
Project-executing agency	Direction Générale des Barrages et des Grands Travaux Hydrauliques – DGBGTH Commissariats Régionaux au Développement Agricole – CRDA Société d'Exploitation du Canal et des Adductions des Eaux du Nord – SECADENORD	
Consultant	AHT	
Year of ex-post evaluation	2005	
	Project appraisal (planned)	**Ex-post evaluation (actual)**
Start of implementation	1985	1987
Period of implementation	1985 - 1989	1987 - 2002
Investment costs	approx. EUR 121 million	approx. EUR 62 million
Counterpart contribution	approx. EUR 56 million	approx. EUR 30 million
Financing, of which Financial Cooperation (FC) funds	approx. EUR 32 million	approx. EUR 22 million
Other institutions/donors involved	approx. EUR 33 million	approx. EUR 10 million
Performance rating	3	
• Significance / relevance	3	
• Effectiveness	3	
• Efficiency	4	

Brief Description, Overall Objective and Project Objectives with Indicators

The first phase of the project was appraised in 1982 and comprised the modernisation and development of the perimeters of Ras Djebel, Aousja, Gallat El Andalous and Henchir Tobias for gravity irrigation. Following a review of the concept in a second phase (1993), the irrigation system was changed to a sprinkler system and the irrigation areas of the perimeters were expanded. Additionally, El Alia-Menzel Jemil and Zouaouine were developed under the second phase. The total irrigated area amounts to about 11,300 ha.

Under a complementary measure it was ensured that the farmers were connected to the irrigation system, user groups were created and operational advice as well as an analytical accounting system were introduced.

The project mainly pursued the following objectives:

- Overall objective: Economically efficient increase in agricultural production (real internal rate of return of at least 4%).
- Project objective: Increase in agricultural family incomes from 500 TND/ha (Tunisian dinar per hectare) without the project to 1,500 TND/ha with the project. Increase in agricultural production from an intensity of use of land of about 100% to 115% (irrigation area of about 11,200 ha).

Further desired results were positive environmental impacts thanks to the reduced use of groundwater close to the surface (in the following only referred to as groundwater), as it was feared that the groundwater level might drop if nothing was done, and a larger degree of self-reliance for food.

Today, after almost 25 years, we consider that the objectives set were only partly appropriate.

From today's perspective, the overall objective should be to improve the living conditions of the target group, measured by the increase of their incomes from irrigated agriculture. We consider that a threefold increase compared with the situation without the project – as chosen at the time of project appraisal – is rather ambitious but still achievable.

With regard to the project's efficiency it would be recommended from today's perspective to set a higher rate of internal return for this kind of project than in the project appraisal report, i.e. at least 6% instead of the targeted 4%.

Project Design / Major Deviations from the original Project Planning and their main Causes

In the course of project implementation considerable changes were made to the original feasibility draft of the year 1982, on which the project appraisal was based. As a result of a review of the year 1985, the planned gravity irrigation system was redesigned in order to foster a more rapid introduction of sprinkler systems. Moreover, the originally planned reorganisation of property boundaries could only be implemented to a limited extent.

The major changes compared to the original draft were made in phase 2, when the planning of distribution pipes and hydrants was adjusted to the irregular course of existing paths, property boundaries and watercourses after consultation with the users. In accordance with the standard of technology of the time the consultants determined that the total demand for irrigation water was about 70 million m^3 per year (corresponding to 6,590 m^3/a per ha of net irrigation area). However, on the basis of recent developments, about 54 million m^3 would be sufficient provided that a high share of water-saving irrigation methods is used and that the cultivation and irrigation practice is appropriate.

Actually, since 2000, the perimeters have been supplied with river water in the amount of about 23 to 30 million m^3 in the dry years of 2001 and 2002 and about 17 to 20 million m^3 in normal years. The very low capacity utilisation of the systems in normal years compared to other irrigation projects is partially due to the fact that they are used as back-up system: In most perimeters the need for water is covered by rain and groundwater. Only if they are insufficient is the (expensive) water from the irrigation systems used. However, the system has been far from fully utilised even in very dry years. This reflects the fact that water-saving irrigation technologies were developed only after project appraisal and that they are being used adequately.

The consulting services under the complementary measure considerably contributed to improving the qualification of the project-executing agency. However, the analytical accounting

programme which was developed by the consultant could only be used for a short period of time due to severe functional and technical deficiencies of the software. Further, not all parts of the sophisticated programme were implemented to control salinity.

From today's perspective, the package of measures should have focused more on the social aspects of an irrigation project. Thus, questions regarding land ownership legislation, land consolidation and the legal framework for the use of groundwater were in fact recognised as problems but not appropriately covered under the complementary measure. Moreover, the infrastructure was not planned in a participatory manner and did not correspond to the wishes and ideas of the users at the beginning. Especially the initial difficulties that occurred at the start of operation of the perimeters might thus have been reduced. Users' associations and self-administration of parts of the system were only introduced under the second phase and thus at a relatively late stage of project implementation. However, the original concept of the project was state of the art at the time.

Considerable delays occurred in the implementation schedule compared with the project appraisal report. First of all, the review of the original draft and the subsequent approval procedure took several months. The preparation of the numerous tenders and the sluggishness of the award of important supplies and construction work caused further delays, so that the actual work started with a delay of 24 months and phase 1 was taken into operation only about 40 months later than planned in the project appraisal report. Similar delays occurred in phase 2. The last work, the construction of roads and the development of the irrigation systems, was only completed in the years 2002/2003 with a delay of almost 7 years.

Key Results of the Impact Analysis and Performance Rating

According to criteria corresponding to today's requirements we assess the achievement of objectives as follows:

The overall objective of raising family incomes threefold can be considered as almost achieved. In all farm models that we examined the farm incomes increased and are 2.6 times higher on average in real terms compared with the situation without the project. However, the factors vary between 1.2 and 4.5 according to the farm model, which means that all individuals did not benefit equally from the project.

The originally defined indicator of achievement of the project objective "increase of the intensity of use of land from 1.0 to 1.15" was not achieved. The intensity of use of land remained almost constant. It is about 1.03 in dry years and about 0.9 in normal years. However if the project objective is measured by the increase in yields per ha of total farmed area, the picture is different according to the farm models: in all farms the yields per hectare of farmed area increased and are about 2.2 times higher than without the project. However, the factors again vary between 1.3 and 3.6 depending on the farm model.

The minimum profitability of 6% which is requested today was not achieved. According to our calculation it is around 4%.

The intended positive environmental impacts due to a reduced use of groundwater were only partially achieved. The pressure on the use of groundwater was reduced as a result of the provision of alternative sources of water. However, groundwater is still being largely used in the project area.

At the time of project appraisal, the 3,120 farms located in the project region and their families were defined as target group. Currently, about 4,700 users are registered in the users' associations. Even assuming that this number is in fact slightly higher than calculated due to the

lease and division of land it can be noted that the project reached more families altogether than originally planned..

The main socio-economic impact of the project was that it contributed to increasing the household incomes of the families earning a living from agriculture. However, the target group is very heterogeneous and comprises both small farmers and large farm enterprises. No contribution of the users to the investment costs was planned at the time of project appraisal but this corresponded to the state of the art of the time in terms of development policy. In retrospect, it would have been appropriate to include a progressive contribution to the investment costs adapted to the ability to pay of each individual farm.

Under the appraisal of the second phase, users' associations were created within the project and the operation of subsystems of the perimeters was transferred to them. Thus the project contributed to promoting participation of the target group.

According to the project appraisal report, no gender-specific effects were aimed for. Consequently, no such effects were noticed in the final follow-up and the final evaluation.

Regarding the project's **effectiveness** we rate it as sufficient (**rating 3**). The intensity of use did not rise from 1.0 to 1.15 as expected, but yields per hectare of farmed area increased about 2.2 times in all farms.

We rate the project's **efficiency** as slightly insufficient (**rating 4**). In light of the fact that only about 60% of the capacity of the system has been used so far in peak times, we rate the production efficiency as unsatisfactory. Regarding allocation efficiency, the farm models show that farms were able to significantly increase their revenues thanks to the project. These are slightly lower if reduced by the amount of subsidies paid for water and the water-saving irrigation equipment. According to a rough calculation, the internal rate of return of the project is about 4% and thus below the required minimum rate of return of 6%.

As regards the developmental effectiveness of the project we classify its **relevance/significance** as sufficient (**rating 3**). The living conditions of farmers improved significantly in the region and the overall objective was almost achieved as revenues are 2.6 times higher than before the project.

For the above reasons and given the fact that the perimeters have been operated in a sustainable manner for 14 years we rate the **project's performance as overall sufficient** (**rating 3**).

General Conclusions

Most general conclusions of the project are already being implemented in current irrigation projects.

Thus, irrigation projects are planned in a participatory manner today and the required amount of water is determined in cooperation with the users. In doing so it is recommended to use local knowledge. Equally, agreements are made to determine the rights and obligations of the users with regard to the operation of the system. Questions of territorial planning, land consolidation and water rights should be clarified at the beginning of the construction phase. This is the only way to ensure that the system corresponds to the abilities and needs of the users and is later used to its full capacity.

To the extent possible, also larger perimeters should be operated by the users. To this end it is recommended to create a corresponding users' group which must be prepared to perform its tasks relating to management and the collection of fees through personnel support measures if

required. The creation of users' associations contributes to the sustainable operation of the system and strengthens the democratic structures and possibilities of participation of poor population groups.

Moreover, a contribution of farmers to the investment costs – n line with their ability to pay – is appropriate. Generally, farmers are prepared to bear part of the investment costs. This is notably the case if they are involved in the planning phase and if the applied concepts are in harmony with their socio-cultural background. Often the distribution of land among the target group is heterogeneous in irrigation projects. However, it is mostly not recommended to exclude wealthy farmers from the system. Yet, it is generally possible to demand a higher contribution to the investment costs from wealthier farmers through progressively graduated contributions and thus exclude negative distribution effects.

Legend

Developmentally successful: Ratings 1 to 3	
Rating 1	Very high or high degree of developmental effectiveness
Rating 2	Satisfactory developmental effectiveness
Rating 3	Overall sufficient degree of developmental effectiveness
Developmental failures: Ratings 4 to 6	
Rating 4	Overall slightly insufficient degree of developmental effectiveness
Rating 5	Clearly insufficient degree of developmental effectiveness
Rating 6	The project is a total failure

Criteria for the Evaluation of Project Success

The evaluation of the "developmental effectiveness" of a project and its classification during the ex-post evaluation into one of the various levels of success described in more detail below concentrate on the following fundamental questions:

- **Are the project objectives reached to a sufficient degree (aspect of project effectiveness)?**
- **Does the project generate sufficient significant developmental effects (project relevance and significance measured by the achievement of the overall development-policy objective defined beforehand and its effects in political, institutional, socio-economic and socio-cultural as well as ecological terms)?**
- **Are the funds/expenses that were and are being employed/incurred to reach the objectives appropriate and how can the project's microeconomic and macroeconomic impact be measured (aspect of efficiency of the project conception)?**
- **To the extent that undesired (side) effects occur, are these tolerable?**

We do not treat **sustainability**, a key aspect to consider for project evaluation, as a separate category of evaluation but instead as a cross-cutting element of all four fundamental questions on project success. A project is sustainable if the project-executing agency and/or the target group are able to continue to use the project facilities that have been built for a period of time that is, overall, adequate in economic terms, or to carry on with the project activities on their own and generate positive results after the financial, organisational and/or technical support has come to an end.