

Ex Post-Evaluation Brief

Morocco: Drinking Water Supply in the Loukkos Region

Programme/Client	Drinking Water Supply in the Loukkos Region BMZ No.1996 66 298	
Programme executing agency	Office national de l'eau potable – ONEP	
Year of sample/ex post evaluation report: 2011*/2011		
	Appraisal (planned)	Ex post-evaluation (actual)
Investment costs (total)	EUR 49.1 million	EUR 8.5 million
Counterpart contribution (company)	EUR 14.9 million	EUR 1.9 million
Funding, of which budget funds (BMZ)	EUR 34.2 million	EUR 6.6 million

* random sample

Project description: The project initially included the construction of a waterworks at the Oued El Makhazine dam and laying two pipelines, one to Larache via Ksar El Kébir and one to Ouazzane, each provided with pumping stations and balancing reservoirs. Before construction began it was decided to divide the project into three phases of system expansion. In the first phase, only the waterworks and the pipeline to Ksar El Kébir were built (commissioned in 2002). The second expansion (the pipeline linking Ouazzane to the waterworks) was deferred (commissioned in 2007). The third expansion phase, the transfer pipeline to Larache, was put back even further (commissioning expected in 2012), since Larache, on a temporary basis, is still able to draw its supplies from an aquifer close to the town. Only the first phase (the waterworks and the pipeline to Ksar El Kébir) forms the subject of this evaluation. In addition to supplying the town of Ksar El Kébir, at the time of ex post evaluation the waterworks had also been supplying the town of Ouazzane and numerous groups of villages along the pipeline route for about four years. Hence this evaluation's reporting on certain issues - especially the waterworks' capacity utilisation, operating costs and revenues - also takes Ouazzane into account.

Objective: At project appraisal, the overall objective set for this FC project was to make a contribution to reducing the health risks facing the population of the Loukkos region. No indicators were defined for the overall objective. In line with the change in project design (the division into three phases), the project objectives were modified as follows:

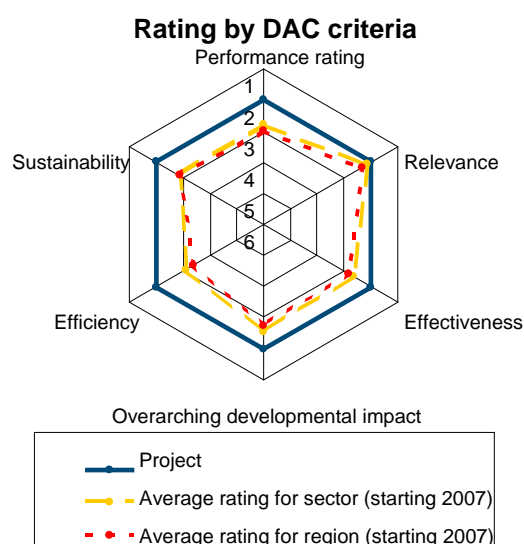
- To make additional volumes of water available, sufficient to supply the Loukkos region with safe drinking water on a year-round basis.
- To connect the town of Ksar el Kébir to the regional water supply.

Overall rating: 2

Waterworks and supply pipeline are well managed and operated. Ksar el Kébir and the neighbouring villages receive a continuous supply of clean drinking water. The scheme fits into the national water strategy, as well as into a regional supply concept.

Of note:

The project was divided into phases before implementation began, and initially only the first stage was carried out. This was because of revised estimates for water demand. From today's perspective, this seems a reasonable modification.



EVALUATION SUMMARY

Overall rating: Based on the quality of its operation and management, and the important role it has played in supplying the town of Ksar El Kébir and the neighbouring groups of villages with clean drinking water, the project has been rated as 'good'. **Rating: 2.**

Relevance: According to the Moroccan water strategy analysis, the quantity of water that Morocco requires each year will climb from its current level of 13.5 billion m³ to around 16 billion m³ by the year 2030. In order to meet this additional demand, one of the points on which the national water strategy focuses - both now and for the future - is the expansion of existing water infrastructure, through building small, medium and large dams to limit the overexploitation of groundwater reserves. This will also reduce the attendant risk of those reserves being polluted by agricultural chemicals. Until the waterworks financed by this FC project came into operation, well fields close to the point of use were the sole source of supply for the population of the Loukkos region. Before the programme commenced there was a latent risk to health during the summer months, due to inadequate water provision and frequent supply interruptions. The provision of a continuous alternative supply of drinking water served to counter that risk.

Prior to implementation, the planning and design of the project were fundamentally changed and – contrary to the original plans – implemented in phases. The main reasons for this modification were (i) a new estimate of water demand for the towns of Larache and Ouazzane, (ii) a revised population forecast and (iii) greater prioritisation of rural water supply. Connecting the largest town in the region, Larache, to the regional water system was substantially deferred, as the closure of a large tea plantation provided at least temporary relief in the supply situation. From today's perspective, this change in project planning seems both understandable and reasonable.

Coordination between donors has gained in importance over recent years. Within the sector a vigorous, well-coordinated dialogue now takes place, to which German DC actively contributes.

This FC project addressed a major problem in regional drinking water supply, and it fits well into Morocco's national water strategy. Without the project, the marked rise in demand seen between 1996 and 2010 in Ksar el Kébir would have resulted in substantial supply restrictions for the overwhelming majority of the population. With a chain of effects that was plausible through all its stages, the project was appropriately conceived to achieve the impacts it targeted. We have therefore rated the project's relevance as 'good' (Sub-Rating: 2).

Effectiveness: The waterworks which this project financed forms the core of the regional water supply system. At the time of ex post evaluation, it was being used to supply urban districts (Ksar El Kébir, Ouazzane) as well as rural areas. Under the first stage, financing was provided for the important pipeline to Ksar El Kébir as well as for the waterworks. The

project objectives and objective indicators defined during appraisal were adapted during the course of evaluation to suit the revised project design (see remarks under 'relevance'). Overall, these objectives were achieved.

- **Population supplied:** At the time of this evaluation, around 200,000 people living on the Loukkos plain benefit from the waterworks. The pipeline from the waterworks to Ksar El Kébir that was built under this project fits within the regional supply network. It was constructed during the first expansion phase, along with the waterworks. Currently around 147,000 people benefit from the new pipeline: 135,000 in the town of Ksar El Kébir, and around 12,000 living in neighbouring villages.
- **Security of supply and water quality:** Since the waterworks was commissioned in 2002, the water supply system has always supplied drinking water round-the-clock. Service outages, whether at the waterworks or individual pipelines, have not led to supply shortages for end users. This has enabled consumers to end the unhygienic practice of storing drinking water for lengthy periods, which was previously the norm. The quality of the drinking water supplied conforms to Moroccan standards. Since the infrastructure financed by this project was commissioned, routine bacteriological tests conducted by the provincial health authority have yielded unsatisfactory results in only very few cases.
- **Average consumption:** Across the supply system, average per capita usage (including non-domestic usage) presently stands at just under 100 L/pers/day – a level which is appropriate for Morocco, and is also worthy of support in the general context of domestic connections.
- **Waterworks capacity utilisation:** At the time of ex post evaluation, the towns of Ksar El Kébir and Ouazzane, as well as neighbouring groups of villages, had been connected to the water supply system. Capacity utilisation at the waterworks currently equates to around 90% of installed capacity.
- **Technical water losses:** Technical water losses in the pipeline to Ksar El Kébir are presently running at around 4.4%. As such, they are still slightly below the threshold value of 5% that is usually accepted internationally.

Based on the level of performance attained, the effectiveness of these facilities has been ranked as 'good' (Sub-Rating: 2).

Efficiency: Investment costs: According to ONEP records, the costs for the facilities in the first expansion stage amounted to MAD 93 million (EUR 8.5 million). Specific costs in this first phase correspond to MAD 878 (EUR 80) per person, which is reasonable for the production and transfer components of a hydraulic water supply system. If we take the estimated costs for the overall system (including phases 2 and 3) into account, specific costs

then work out at MAD 840 (EUR 76) per person, somewhat below the level of the first stage of expansion.

Phasing: Phasing the implementation of the project made a significant contribution to ensuring that capital commitments were scheduled in a progressive, needs-based manner. Postponing the second expansion stage guaranteed a sensible utilisation level for the FC funding deployed for these facilities.

Waterworks sizing (capacity planning): Due to uncertainties in the forecasts of reservoir water quality, particularly turbidity levels following heavy rains in the catchment area and near the dam, a second sediment tank was incorporated into the plant. Because of the good quality of the raw water, this has not yet been required (indicating a very cautious approach to design). With regard to the costs of the first expansion stage, the additional costs (around 3% - 5%) arising from this cautious, safety-oriented approach to capacity planning are reasonable.

Water works capacity utilisation: Based on 16-hour operation, the capacity of the waterworks is 7 million m³ per day. Up until 2007, the year when the pipeline to Ouazzane came into operation and the first villages were connected to the pipelines to both Ouazzane and Ksar el Kébir, the waterworks was not fully utilised. The main cause for this was that - contrary to the assumptions made during planning - the wells belonging to RADEEL, the municipal utility company, remained in operation, as these sources cost less than obtaining drinking water from ONEP. However, since 2007 capacity utilisation has climbed steadily; in 2010 it reached 7 million m³ per day (i.e. full capacity utilisation).

Tariffs and the contribution of the waterworks to ONEP's operating results: The waterworks' revenues are comprised firstly of income from sales to RADEEL, the municipal utility company, and secondly of 'internal' sales of water to other ONEP operating units (rural water supply / Ouazzane town). Tariff levels are approved by the Government. These tariffs - for direct sales within the network managed by ONEP and for deliveries to major customers such as RADEEL - are sufficient to cover operating and maintenance costs. However, they are not adequate for full recovery of depreciation and financing costs. According to ONEP's Controlling department, in 2010 the cost centre for the waterworks and pipeline showed a small deficit of MAD 98,971 (EUR 9,000). However, write-offs against pipelines are only allocated to the waterworks cost centre in part. Taking depreciation for all the pipelines into account increases the deficit to MAD 6 million (EUR 520,000).

Collection efficiency: The waterworks does not supply any end customers; it only produces water for other ONEP operating units and for RADEEL, the municipal utility company. In the past RADEEL has always paid its invoices punctually, so collection efficiency stands at 100%. However, due to the small number of customers, the collection efficiency statistic has only limited meaning. Collection efficiency at RADEEL is unsatisfactory at present. RADEEL balances losses from water supply with gains from its electricity supply business.

As a result the municipal utility company was able to show a small profit in 2010 (see also the comments on RADEEL under 'sustainability').

The key parameter that can be influenced by planning and implementation - specific investment costs per consumer - is seen as indicating a high level of efficiency. Considering the complicated planning and implementation history, and given that an evaluation of the first expansion stage can offer only a partial picture of efficiency, the issues mentioned above - a slight tendency to oversizing design capacity on safety grounds, and the low initial level of capacity utilisation – are not considered as reasons to reduce the rating awarded. We have therefore classified these aspects as not being significant, and we have assessed the project's efficiency as just reaching a 'still good' level (Sub-Rating: 2).

Overarching developmental impact: Water quality and security of supply: Due to lack of data, it is not possible to confirm that waterborne diseases have reduced over recent years in the province of *Larache* or in the town of *Ksar El Kébir*. Hence any statement made here on attaining the objective can only be formulated on an indirect basis (i.e. a statement founded on plausibility). Important variables that influence the cause-effect relationship, in addition to hygiene practices within the target group when handling water, include the quality of the water and its continuous availability (avoiding water storage by consumers). The project succeeded in redressing the inadequate supply of drinking water to the town of Ksar El Kébir which formerly existed during the summer months (see also relevance and effectiveness). In Ksar El Kébir, drinking water quality - excluding a very small number of complaints – conforms to Moroccan standards. There are no further indications of any other contamination. It is therefore reasonable to assume that the risk to health has been reduced.

Wastewater disposal: Wastewater disposal in Ksar el Kébir (not part of this project) poses a risk to the project's positive impact on public health. Just as in 2002, urban wastewater is still accumulated in collectors and discharged untreated into the Loukkos. Nevertheless, even in the dry summer months, the Loukkos contains enough water to ensure that the wastewater is diluted. Precise figures on the level of pollution in the Loukkos are not, however, available to us. At present, reports suggest that groundwater resources should not be affected by the unsatisfactory provisions made for wastewater disposal. Furthermore there is no indication of any direct health risk to the population from the untreated wastewater. A wastewater master plan was recently produced for the town of *Ksar el Kébir*. It envisages very high investment costs, amounting to MAD 607 million (EUR 55 million). At present it is not thought likely that this project, or any of its individual components, will be implemented in the near future.

In summary, it is reasonable to assume that quality of life has improved for the population of *Ksar el Kébir* as well as in the groups of villages which have been connected to the system, and that waterborne disease no longer plays any significant role. We also assume that the project has had a positive impact for the target group on their living conditions – includ-

ing their health – and we have therefore assessed the project's impact as 'good' (Sub-Rating: 2).

Sustainability: Operation of facilities: The facilities constructed in the first phase of expansion went into operation at the end of 2002. Apart from the usual signs of wear and tear, after nine years in operation the waterworks appears to be well kept up and well maintained. All the equipment in the plant is either in operation or ready to be brought into operation when needed. ONEP operates the waterworks using its own qualified staff, from technicians through to chemists. Smaller repairs are carried out by the staff. Supplies of service parts and larger repairs are undertaken by specialist firms, working under contracts with set unit prices. These contracts for goods and services, including consumable supplies such as chemicals for the waterworks, are concluded following national or regional tenders. It can therefore be assumed that sustainability has been secured with regard to operations, both now and into the future.

Water stocks and availability in the El Makhazine reservoir: The waterworks is supplied with raw water from the dam which was built across the El Makhazine River back in 1979. The reservoir contains substantial water supply potential which has yet to be exploited. Of the 360 million m³ available each year, currently 120-150 million m³ is used for agricultural irrigation purposes and approx. 7 million m³ for drinking water production. A total of 52 million m³ is reserved annually for drinking water supplies and industry. Even if the waterworks underwent a comprehensive expansion programme (tripling its previous capacity), only around half the water resources reserved annually for drinking water would be utilised. Given the high level of water reserves, it is reasonable to assume that supplies of raw water will continue to be available over the long term, even declining levels of precipitation in the future.

Financial situation of ONEP: Anticipated costs for operation, maintenance and repair, together with a contingency budget, are determined each year by agreement between ONEP's regional boards and its executive board. Funds provided to date have been adequate to cover the procurement of all supplies and spare parts needed and to carry out repairs. Figures indicate that in 2010 ONEP will once again have generated a small surplus, as in previous years. We therefore assume that, over the medium term, an adequate budget will be made available for the operation, maintenance and repair of the facilities financed by this project. However, risks remain with regard to ONEP's financial situation. To date, the government-approved tariffs are not index-linked to inflation, and they do not permit full cost recovery in many parts of the ONEP supply area. Due to a multitude of expensive (and unprofitable) projects, mostly in the areas of wastewater and rural water supply, it will prove increasingly difficult for ONEP to achieve balanced business results. Furthermore, plans to merge ONEP with L'Office national de l'Electricité (ONE, the national energy supplier), present financial risks. In view of the water sector's key significance, it is anticipated that, should financial difficulties arise, the Moroccan state – as in the past – would provide subsidies.

Financial situation of RADEEL, the municipal utility company: According to ONEP, although RADEEL - a major customer, with Ksar el Kébir plus *Larache* from 2012 on - has substantial amounts outstanding in its customer billing, and even though its water operations were unprofitable in 2010, it still pays ONEP's invoices promptly. Up to now RADEEL has been able to balance losses in its water supply business with surpluses from its sales of electricity. In 2010 RADEEL was even able to post a small overall profit. RADEEL's future business development poses a certain degree of financial risk to the project.

Given ONEP's professionalism, sustainability from a technical perspective can be assumed without reservation. Today financial sustainability is assured, so long as cross-subsidies within ONEP remain feasible and are not constrained by extreme increases in cost. Because of the water sector's high social significance, we regard the risk that ONEP will be unable to meet its future responsibilities as small. We have therefore assessed the project's sustainability as 'good' (Sub-Rating: 2).

Notes on the methods used to evaluate project success (project rating)

Projects (and programmes) are evaluated on a six-point scale, the criteria being relevance, effectiveness, efficiency and overarching developmental impact. The ratings are also used to arrive at a final assessment of a project's overall developmental efficacy. The scale is as follows:

1	Very good result that clearly exceeds expectations
2	Good result, fully in line with expectations and without any significant shortcomings
3	Satisfactory result – project falls short of expectations but the positive results dominate
4	Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
5	Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
6	The project has no impact or the situation has actually deteriorated

Ratings 1-3 denote a positive or successful assessment while ratings 4-6 denote a not positive or unsuccessful assessment

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability) The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected).

Sustainability level 3 (satisfactory sustainability): The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability): The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and is very unlikely to improve. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The overall rating on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. Ratings 1-3 of the overall rating denote a "successful" project while ratings 4-6 denote an "unsuccessful" project. It should be noted that a project can generally be considered developmentally "successful" only if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are rated at least "satisfactory" (rating 3).