

# Ex post evaluation – Tunisia

**Sector:** 14020 Water supply and sanitation – large systems  
**Project:** Sewage disposal in 4 towns, BMZ No. 1996 65 472\*  
**Implementing agency:** Office National de l'Assainissement

## Ex post evaluation report: 2018

		(Planned)	(Actual)
Investment costs (total)	EUR million	17.3	29.6
Counterpart contribution	EUR million	3.5	12.2
Funding	EUR million	13.8	17.4
of which BMZ budget funds	EUR million	13.8	17.4

\*) Random sample 2018



**Summary:** The project was aimed at improving wastewater disposal, originally in four towns in northern Tunisia (Mateur, El Alia, Ras Jebel and Raf Raf) along with smaller neighbouring municipalities. The project design was subsequently modified to include the construction of two sewage treatment plants in Mateur and Aousja instead of the original three, as well as the extension and renewal of the sewage networks in 5 towns, including transfer pipes and pumping stations.

**Objectives:** The objective at outcome level was to properly collect and treat domestic and (partly pre-treated) commercial wastewater at the project locations. This was designed to improve sanitation in the beneficiary towns and some neighbouring municipalities.

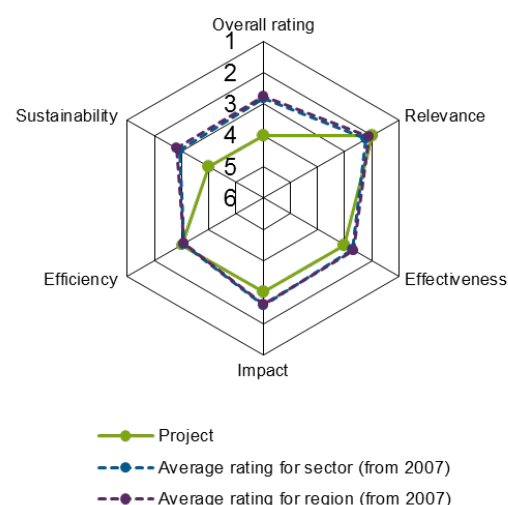
The aim at the impact level was to contribute to the preventive water protection efforts for Tunisia's Ichkeul and Bizerte lakes, as well as for the Mediterranean Sea. In addition, the project was intended to help reduce the health risks to the population of the Bizerte region, and thus improve their living conditions.

**Target group:** The direct target group was the local population of the beneficiary towns, which, together with the neighbouring municipalities involved, was estimated at 108,000 inhabitants at the target horizon (2010). At the time of the evaluation, there are actually around 150,000 inhabitants. In addition, the residents around the lakes and the Mediterranean Sea, as well as Tunisian and foreign tourists, should benefit from the improved water quality.

## Overall rating: 4

**Rationale:** The collection of wastewater at the project locations meant the health-related objectives of the project were achieved to a large extent. Due to the poor operating condition of the sewage treatment plant in Mateur, however, the treatment parameters are no longer met there, meaning that the wastewater is subject to inadequate treatment before being discharged into Lake Ichkeul. The environmental objectives are therefore only partially achieved. In addition, it is likely that the inadequate maintenance and repair activities in the next few years will likewise affect the still functioning but much younger plant in Aousja. The project-executing agency's budgets for ongoing operations and replacement investments in particular are proving insufficient.

**Highlights:** The extremely low sewage fees in Tunisia, which are the same nationwide, are one of the main reasons for the inadequate financial resources of the project-executing agency. On a positive note, regular and significant annual tariff increases have been implemented since 2016.



## Rating according to DAC criteria

### Overall rating: 4

#### Ratings:

Relevance	2
Effectiveness	3
Efficiency	3
Impact	3
Sustainability	4

#### Relevance

There are many reasons for the threat to surface waters in north-eastern Tunisia. In addition to the construction of a large number of industrial plants in the vicinity of the city of Bizerte, grey water in particular was discharged untreated into two coastal lakes (Lake Bizerte and the connected Lake Ichkeul) as well as into the Mediterranean Sea. As part of Ichkeul National Park and a UNESCO World Heritage Site, Lake Ichkeul – which is an important stopover for many migratory birds on their way to Sub-Saharan Africa – is considered to be in particular need of protection. What is more, there was an indirect health hazard from the contamination of agricultural land and local groundwater resources, since this untreated wastewater was discharged above ground over several kilometres via partially dried riverbeds on their way to the above-mentioned lakes and the Mediterranean. Furthermore, the partial above-ground discharge of raw sewage within the villages posed a direct health hazard to the population.

The project approach of contributing to water conservation by improving the sewerage system within the project locations and constructing wastewater treatment plants appears to be coherent because the sewage treatment in the wastewater treatment plants (outcome) prevents the discharge of raw sewage into the two lakes and the Mediterranean Sea, and can thus make a positive contribution to protecting these water bodies (impact). The improved sewerage system in the project locations can reduce above-ground wastewater flows or stagnating wastewater and generate positive effects on health (impact), as can the avoidance of above-ground raw sewage in the immediate vicinity of agricultural land. In addition, the discharge of untreated raw sewage into the coastal Mediterranean obviously had a negative impact on tourism, at the seaside resort of Raf Raf Plage for example. The project is given additional relevance by the protection of groundwater resources in Tunisia, which, with renewable water resources of just 376m<sup>3</sup> per capita per year,<sup>1</sup> is one of the world's most arid countries.

Regional environmental protection and resource conservation are both still high priorities for Tunisia and Germany, and the measures were in line with the sector concept of the BMZ and complemented other FC projects in the region<sup>2</sup>. Alongside German DC, the EIB, AFD and the World Bank are among the most important donors in the wastewater sector. The relevance of the project is rated good.

#### Relevance rating: 2

#### Effectiveness

With regard to the project measures within the city – in particular the rehabilitation and extension of the sewerage system – the project objectives were achieved. The target level for the quantitative indicators (connected population, treated wastewater volume) was either reached or exceeded. Nevertheless, there have been isolated problems with clogged pipes or intermittent flooding, which relate in particular to inadequate rainwater drainage (for which the given municipality is theoretically responsible).

<sup>1</sup> Source: FAO, 2015

<sup>2</sup> e.g. sewage disposal for 11 cities in the Medjerda valley (BMZ Nos. 1984 65 212 and 1991 66 075) and sewage disposal for Lake Bizerte (BMZ No. 1993 65 644), both assessed with an overall rating of 3 in 2009.

However, the largest share of the investment was used to construct the treatment plants, with two plants (in Mateur and Aousja) being built instead of the three originally planned (in Mateur, Ras Jebel and El Alia) following a change in the project design. Due to the project implementation delays (see “Efficiency”), the treatment plant in Aousja (commissioned in October 2015) was completed much later than the treatment plant in Mateur (commissioned in June 2005). The output of the two wastewater treatment plants was assessed very differently at the ex post evaluation (EPE), and this can primarily be explained by the poor state of repair at the plant in Mateur (where deficiencies meant that only one of the two treatment lines was operational at the time of the evaluation) as compared to the still relatively new plant in Aousja.

Given the poor condition of the partly defective technical equipment as well as the suboptimal technical design of the aeration tanks, sewage treatment in Mateur is functional but inadequate, and is generally no longer able to meet the statutory thresholds. Maintenance deficiencies can also be detected in the Aousja wastewater treatment plant, and are evident, for example, in the condition of the electromechanical equipment and in defective measuring instruments. What is more, the technical construction of the buildings is inadequate in places, leading to visible leaks in the clarifiers due to substandard concrete work for example. Given the young age of the plant, however, these deficits do not affect plant performance yet; the plant generally achieves the legal limit values for key parameters such as filterable substances (AFS  $\leq$  30mg/l) and oxygen-consuming compounds (COD  $\leq$  125mg/l, BOD<sub>5</sub>  $\leq$  30mg/l). However, the Tunisian water and environmental law also prescribes extensive nitrification (NO<sub>3</sub>  $\leq$  50mg/l for TKN  $\leq$  5mg/l) and the elimination of water-eutrophying phosphorus (P  $\leq$  2mg/l). Despite the simpler analysis, these parameters are not collected and documented as consistently. Even in Aousja, the parameters frequently fail to achieve the legal requirements. The target achievement at the outcome level can be summarised as follows:

Indicator	Status PA, target PA	Ex post evaluation
(1) Population involved	Actual: no wastewater treatment plant as of yet Objective: 120,000 <sup>3)</sup>	roughly 150,000*
(2) Connection rate of households to the wastewater network	Actual: 75–90% Target: 90%	95–99%
(3) Connection rate of commercial buildings to the wastewater network	Actual: n.a. Target: 80%	87%
(4) Treated wastewater volume	Actual: - Objective: 10,200m <sup>3</sup> /d (3 wastewater treatment plants)	13,400m <sup>3</sup> /d (2 wastewater treatment plants)
(5) Wastewater treatment plant discharge values (BOD <sub>5</sub> )	Actual: - Objective: < 30mg/l	Mateur: Mostly not achieved Aousja: Mostly achieved
(6) Recycling of wastewater sludge or storage in controlled landfill (new for EPE)	Actual: - Target: 95%	Not achieved

\*) but with significantly higher overall costs, see section on “Efficiency”

<sup>3)</sup> original target value 100,000, increased to 120,000 in line with the assumptions made at the PA

An additional indicator considered for the purposes of the evaluation (reuse of sewage sludge) could not be achieved. At present, the dried sludge is stored onsite for several years until the storage capacity is exhausted. Partial quantities are then disposed of in landfills to reduce the burden.

In summary, the disposal target values are achieved within the cities, while the target values for sewage treatment are met by just one of the two wastewater treatment plants (Aousja). However, the assessment

of the Aousja carries more weight, as its capacity is more than double that of the Mateur plant. Accordingly, the effectiveness of the project is still rated satisfactory.

**Effectiveness rating: 3**

### Efficiency

The project implementation was marked by massive delays. The actual time required for the implementation more than quadrupled compared to the implementation period of 53 months planned at the project appraisal. One of the main causes of these delays was the difficulty experienced, consulting with the respective municipalities, in identifying and taking possession of suitable sites to construct wastewater treatment plants. Resistance from the population also made construction of the wastewater treatment plants more difficult. In particular, inhabitants were reluctant to see the construction of a wastewater treatment plant within their own municipality boundary which would also be used to treat wastewater from neighbouring municipalities. In the end, this also led to a change in the project design, with wastewater disposal in the project cities being carried out by just 2 instead of the planned 3 wastewater treatment plants. In addition to considerable costs for the long transfer pipelines, this led to higher operating costs as the wastewater had to be pumped not only over long distances, but also rising many metres in height due to the difficult topographical conditions. Ultimately, the second wastewater treatment plant (Aousja) could not be commissioned until October 2015 – 19 years after the signing of the financing agreement. The plant in Mateur has been operational since June 2005.

These inefficiencies related to the implementation did not result in a significant increase in specific costs as compared to the planning, however, despite the fact that the FC financial contribution had to be increased from EUR 13.8 million to EUR 17.4 million due to the increased project costs.<sup>3</sup> Given that the number of connected inhabitants increased in almost the same proportion as the project costs – from 100,000 to 150,000 inhabitants, thanks to the connection of additional settlements to the wastewater treatment plants – the specific investment costs increased only slightly compared to the original planning (EUR 197 per capita compared to EUR 173 per capita). This figure is within the usual range of comparable projects, but is difficult to compare due to the individual scope of measures. It should also be noted that there seems to be no alternative solution acceptable to all participants, even from today's perspective.

The allocation efficiency stems in particular from the ratio of project costs to the treatment of the wastewater from 150,000 inhabitants, which was discharged untreated into surface waters that were already polluted. This appears satisfactory from today's perspective, but not ignoring the fact that the smaller wastewater treatment plant in Mateur no longer treats the wastewater to a sufficient extent.

In summary, the project efficiency continues to be rated as satisfactory despite the considerable delays mentioned above, in particular because an alternative solution acceptable to all participants is nowhere in sight from today's perspective.

**Efficiency rating: 3**

### Impact

The desired environmental and health impacts were achieved by the drainage and – for the most part – adequate treatment of the household wastewater of 150,000 people. However, health risks remain in the event of isolated heavy rainfall, which can lead to flooding from the sewerage system, particularly in the village of Mateur, due to the lack of sufficient rainwater drainage. Further problems arise from the problematic drainage of wastewater from illegally constructed residential districts. While it is mandatory to report the severe progression of wastewater-induced diseases, the relevant health authorities have not received any such reports in recent years.

The impact of the project on the water quality of Lake Ichkeul (and indirectly on Lake Bizerte) is rated inadequate, however. The wastewater discharged into this lake is first treated in the Mateur treatment plant, which no longer meets the legal requirements. The purification capacity of the Aousja wastewater treat-

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<sup>3</sup> The increase took place in 2003 by reprogramming residual funds from the Lake Bizerte sanitation project (BMZ No. 1993 65 644).

ment plant – which is more significant in terms of quantity – clearly makes a positive contribution to protecting the neighbouring Mediterranean Sea, however, particularly compared to the previous situation in which raw sewage from the towns of El Alia, Ras Jebel and Raf Raf was discharged near beaches. This also creates better conditions for tourism. Against this background, we continue to rate the impact as satisfactory.

**Impact rating: 3**

### **Sustainability**

The sustainability of proper sanitation is the greatest challenge for the project. To ensure the sustainable technical and economic operation of the plants, it is essential that sufficient financial resources are available to maintain regular plant operations – requiring both energy and operating resources – and to carry out servicing and repair work promptly. This was not the case at the time of the evaluation though.

This is evident from the condition of the wastewater treatment plant in Mateur, where inadequate maintenance activities have led to operating problems. After 13 years of operation, numerous electro-mechanical and electronic components are now out of operation. As a result, frequent breakdowns are now the norm, and the plant no longer meets the necessary treatment parameters. The situation at the Aousja wastewater treatment plant is significantly better, but this is largely due to the fact that it has only been in operation for 3 years. Maintenance deficits are already noticeable today, and even in this relatively new plant there are faulty components with no plans to repair or replace them. In addition, the quality of the structures (e.g. leaking clarifiers) is sometimes unsatisfactory. There is no reason to assume that the wastewater treatment plant in Aousja will not follow the same path as the plant in Mateur, and that comprehensive rehabilitation will become necessary at an early stage.

This is already the case in Mateur, where the plant is awaiting a corresponding investment programme from another donor (EU). However, this (understandable) wait-and-see attitude also illustrates the dependencies which arise from economically unsustainable operations.

The insufficient revenues of the state-owned wastewater disposal company ONAS are mainly the result of a completely inadequate tariff. A family of four, for example, with a daily per capita consumption of 100 litres, only pays around EUR 0.60 per month for wastewater disposal. This explains why ONAS is only able to generate around 70% of its operating budget itself (larger investments are only implemented with the help of external donors). The remaining 30% of its operating budget (which is clearly too low at any rate) is covered by a state subsidy. From today's perspective though it is more likely that the situation will continue to deteriorate. On the one hand, the public sector is becoming much more restrictive with regard to its spending in the wake of rapidly rising public debt. This is also evident at ONAS in the form of budget cuts and hiring freezes. On the other hand, the financial requirements of ONAS will continue to rise as a result of the ageing plant portfolio and the addition of new plants (which will not operate cost-effectively either). All in all, the problem is likely to worsen. In the medium term, donor-financed complementary measures (FC, EU and Switzerland) should counteract this.

No sustainable solutions have been implemented to date in terms of the disposal of wastewater sludge, despite existing concepts which generally provide for agricultural use. At present, the sludge is dried at the plants and then stored there in open areas, uncovered, until these areas are used up (in the case of Mateur, this took around seven years). The waste is then transported to a landfill site, but according to the executing agency, this is also becoming increasingly difficult.

From today's perspective, the sustainability of the project can no longer be rated as satisfactory.

**Sustainability rating: 4**

### 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:

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

Rating levels 1-3 denote a positive assessment or successful project while rating levels 4-6 denote a negative 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. Rating levels 1-3 of the overall rating denote a "successful" project while rating levels 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" (level 3).