

# Ex post evaluation – Morocco

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**Sector:** Water supply and sanitation/waste water management (1402000)  
**Programme/Project:** Water supply, North Morocco (regional cities)  
 BMZ No.1999 66 425\*  
**Implementing agency:** Office National de l'Electricité et de l'Eau Potable (ONEE)



## Ex post evaluation report: 2016

		Water supply, North Morocco (Planned)	Water supply, North Morocco (Actual)
Investment costs (total)	EUR million	39.37	46.80
Counterpart contribution	EUR million	11.76	13.31
Financing (composite financing)	EUR million	27.61	27.61
Financing from sector programme (2002 66 163) assigned retroactively (composite fund.)	EUR million	0.00	5.88

\*) Random sample 2015

**Summary:** The open programme “Water Supply in Northern Morocco (regional cities)” BMZ No. 1999 66 425 comprises, on the one hand, the expansion and renovation of the drinking water systems of ONEE (Office National de l'Electricité et de l'Eau potable, state electricity and water utility company) or their adaptation to more environmentally friendly methods, and on the other, the drinking water supply in rural centres of northern Morocco.

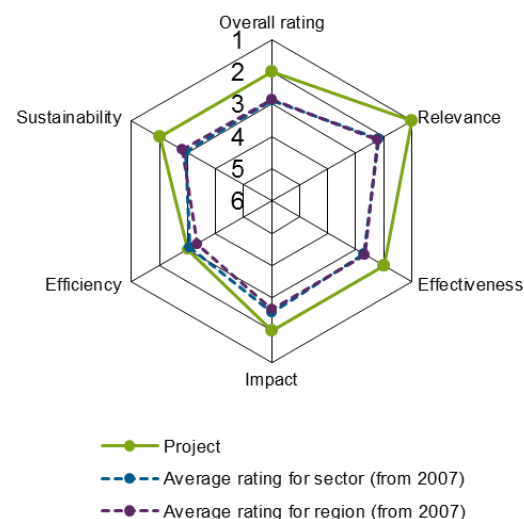
**Objectives:** The objective of the programme was to efficiently secure sufficient production for the continuous supply of the programme area’s population with safe drinking water. This was designed to help reduce the health risks from water-borne diseases for the population in the supply regions and improve living conditions for the population (adapted ultimate objective).

**Target group:** The target group was the total urban population in the North Moroccan programme area, whose supply depended directly on more efficient production of drinking water by ONEE, and the population in rural centres of the Midar region, whose supply was secured by new installations established by ONEE.

## Overall rating: 2

**Rationale:** Overall, the project contributed to improving and securing the supply of water, even though one indicator (unaccounted for water) in some cases lags behind the target values. The facilities are largely in a good to satisfactory state. Maintenance is generally organised efficiently by the executing agency, though there is room for improvement regarding preventive maintenance. It can be assumed that the executing agency is already aware of the majority of the noted deficits, and they will be remedied with measures in the medium term. For this reason, and in light of tariff increases and continued support for the project-executing agency from the state, sustainability is ensured.

**Highlights:** The rural centres in the Midar region have achieved a high collection rate. The quality of the drinking water supplied is assured by means of a comprehensive monitoring programme.



## Rating according to DAC criteria

### Overall rating: 2

Overall result: Taking all the available information, interviews with the various institutions and site visits into consideration, the developmental impacts are altogether rated as good.

#### General conditions and classification of the programme

The open programme “Water Supply in Northern Morocco (regional cities)” BMZ No. 1999 66 425 comprised, on the one hand, the expansion and renovation of the drinking water systems of the state utilities company Office National de l'Electricité et de l'Eau potable (ONEE) or their adaptation to more environmentally friendly methods, and on the other, the drinking water supply in rural centres of northern Morocco. The following individual measures were implemented:

1. Introduction of a pipeline-based water supply in the 5 rural centres of Midar, Tafersit, Ben Taieb, Driouch and Tiztoutine (“Midar and adjacent centres”, 36 % of total costs)
2. Nador waterworks (WW): doubling of capacity through the construction of an additional treatment unit with the capacity to treat 420l/s, and expansion of the treatment plant for sludge accumulating in the treatment process (27 % of total costs)
3. Renovation of M'Harhar WW in Tangier (13 % of total costs)
4. Bouregreg WW in Rabat: new construction of the rinse water recycling system and the sludge treatment plant; new medium-voltage power distribution on the factory premises (12 % of total costs)
5. Zaio water supply: construction of an additional clean water pipeline between Nador WW and the city of Zaio, including a pumping station and interim tank (5 % of total costs).

#### Relevance

The mobilisation and management of limited water resources was and remains a challenge for Morocco. As early as 1995, Morocco adopted a Water Act on the coordination of supply and demand in the sector. Securing the drinking water supply for the population and increasing the connection rate are central concerns of water policy in Morocco. The national water strategy introduced in 2009 is based on six pillars, including the control and development of water supply and the management of water demand in terms of the more efficient use of water.

The ONEE strategy includes the maintenance, protection and development of the urban water supply and the improvement of access to clean water for populations in rural areas.

From today's perspective, the impact logic underlying the project – contributing to the health of the population through investing in the water supply – remains valid. Improving the population's supply of high-quality drinking water serves as the basis for a lower incidence of water-borne diseases and for generally increasing quality of life.

The project was capable of ensuring the supply in Tangier, Rabat and Nador. Tangier and Nador WWs required renovation or expansion to further secure the drinking water supply of the areas they serve. Due to population growth, Nador WW was already unable to meet the water demand (peak load) of the city of Nador at the time of project appraisal; furthermore, the ailing Tangier WW could also have faced supply shortages without the measures. For Midar and the adjacent centres, the connection to Nador WW's increased production capacities promised a secure, pipeline-based drinking water supply by means of household connections for the first time. Previously, the water supply was ensured by tankers that filled the household water tanks every 1-3 weeks. In addition to this, a small number of dug wells containing brackish water were also used as sources of drinking water. Overall, the quality of the water was inadequate. Moreover, the non-pipeline system represented an additional risk of bacterial contamination. In view of the limited water resources, the introduction of rinse water recycling was an ecologically and economically relevant measure in the case of Bouregreg WW.

Overall the relevance of the project is assessed as very good.

**Relevance rating: 1**

### Effectiveness

The defined programme objective was to efficiently ensure sufficient production for the continuous supply of the programme area's population with safe drinking water. The attainment of the programme objectives defined during the appraisal is as follows:

Indicator	Target value	Ex post evaluation
(1) Production area of the ONEE: utilisation of renovated capacity (peak load) [5 years after completion of work]	90 %	Achieved. Utilisation of renovated capacity of M'Harhar WW in Tangier, 5 years after completion of work (2014): 100 %
(2) Production area of the ONEE: utilisation of newly constructed capacity (peak load) [5 years after completion of work]	75 %	Achieved. Utilisation of Nador WW capacity, 5 years after completion of work (2012): 97.6 %
(3) Production area of the ONEE: The drinking water quality is in line with Moroccan standards.	Yes	Achieved. The standard is appropriate. In addition to the production areas, this also applies to the distribution network operated by the ONEE for Midar and adjacent centres.
(4) Midar and adjacent centres: supply for a total of 45,000 inhabitants [5 years after completion of work]	45,000	Achieved. No data is available for 2009 (five years after start-up of operation). 2004: 42,000 inhabitants 2010/11: 48,000 inhabitants 2014: 52,440 inhabitants A significantly higher number can be expected in the summer months.
(5) Midar and adjacent centres: household connection rate [5 years after completion of work]	>75 %	Achieved. 100 %
(6) Midar and adjacent centres: per capita consumption for a) household connections and b) standpipes	a) 40 l/cd b) 10 l/cd	Achieved (2014): a) 55-70l/cd b) no standpipes implemented
(7) Midar and adjacent centres: collection rate	> 95 %	Achieved: >98 % (2014)
(8) Midar and adjacent centres: technical and non-technical unaccounted for water for a) production and b) distribution	<30 %	Partially achieved (2014): a) 3.9 % b) Average of 27.9 % Midar 35.1 %; Driouch 20.9 %; Ben Taieb 22.9 %; Tiztoutine 29.6 %; Tafersit 30.9 %

(9) Continuous water availability (24h)	24h	Fulfilled for the end of the planning horizon (2010/11)
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According to the ONEE, the Nador treatment plant has been operating at almost maximum capacity for years. In 2010 (end of the planning horizon for the project), the capacity usage (91 %) was higher than expected, but still in line with the planning. At the time of the ex-post evaluation, drinking water was being treated using the programme-financed treatment technology as planned, though the failure of some individual components was observed (e.g. sludge treatment, automated control system). According to the ONEE, the renovation or maintenance is either in the planning stages or has already been commissioned.

The drinking water needs of households in the supply area of Midar and adjacent centres has evolved very dynamically compared with the original plan. At 55-70 l/c/d, consumption is above the target level of 40 l/c/d and is considered appropriate. However, this means that the capacity available for the transport and distribution of drinking water had been exhausted at the time of the ex-post evaluation. According to the ONEE, in the period from mid-July to late August – during which time the water demand observed in the supply area is at its highest – there was a deficit of around 25 %. This means that an uninterrupted supply of drinking water to the population in the supply area cannot be assured during this period, and only an alternating supply of the population is feasible. An alternating supply process puts additional strain on the distribution network because of the substantial pressure variations associated with this kind of operation. In terms of the planning horizon at the appraisal (10 years, i.e. until 2010), however, the dimensioning of the expansion was still appropriate.

Alternating operation currently involves the risk that sewage could leak into the pipelines. ONEE has stated that alternating operation has no impact on water quality. Regular quality tests confirm the safety of the drinking water.

According to information from ONEE, most of the households connected to the drinking water supply system also continue to have private tanks. While these tanks may partly offset supply deficits during periods of alternating supply operation, from a technical perspective they represent an additional load on the distribution system during these periods (pressure variations due to transient flow processes), since refilling them in order to restart the supply produces strongly excessive demand for drinking water, which is not in line with actual drinking water demand on the one hand, and which the supply network was not designed to cope with on the other. In addition, the use of private tanks – which are beyond the control and responsibility of ONEE – harbours the risk that the quality of the water within these tanks will deteriorate.

Given the deficiencies in drinking water treatment and distribution capacities as described above, these capacities are currently being expanded through appropriate construction measures to include an additional treatment capacity of 420 l/s at Nador WW as well as to double the transport and expansion of storage capacities in the centres as part of a programme co-financed by the World Bank. It may be assumed that this additional capacity will be put into operation in the near future, eliminating the need for alternating supply during the summer months.

The pumping stations and connected supply water tanks visited in the distribution network for Midar and adjacent centres are in good condition and are well-maintained for the most part. At least one system for pressure surge reduction (air pressure vessel) is not in operation. This, in conjunction with the frequent power outages, represents an additional physical strain on the pipe connections and thus limits the sustainable operation of the conveyor systems.

The quality of drinking water is checked regularly by ONEE and by private institutions at defined sampling points in the network (including at the end user's premises). Meters are read monthly. The facilities visited at the M'Harhar and Bouregreg WWs are generally in good condition. Following discussions with the operating staff, it can be confirmed that the personnel are well-acquainted with the installed system technology.

In summary, it can be stated that the objective of the programme was achieved. Limitations can occur for Midar and adjacent centres as well as for Nador WW (inadequate sludge treatment, water losses, uncon-

trolled water quality due to the use of private tanks).

### Effectiveness rating: 2

#### Efficiency

The implementation period for the programme was significantly longer than planned. The final inspection was carried out in 2011 after 132 months, instead of 47 months as planned. The main reasons for the delays were the construction works being executed in parallel to the ongoing operation of the facilities and the lengthy consultations between the project-executing agency and KfW regarding the measures to be financed as part of the project. The facility in Bouregreg was not commissioned until January 2013. The remaining funds from the project are currently being used to renovate Smir WW. This is still in the planning phase and the project-executing agency expects construction to be completed in 2016/17.

At the time of the evaluation mission, the total cost amounted to approximately EUR 46.8 million (MAD 509 million). Due to the open programme approach, under which some measures were carried out which had not been included in the planning, a target/actual comparison of the total cost proved difficult; cost increases could, however, be found when comparing the individual locations to the appraisal report's provisions. Nevertheless, it is believed that this is due to the fact that the design planning had not been finalised at this point and the measures were often implemented with modifications and on a wider scale. The implementation deviated only slightly from the design planning when these were compared. It should be noted that the specific investment costs for Midar and the adjacent centres – where new connections were provided for 48,000 residents – were very high at EUR 351. This amount, however, is acceptable due to the geological conditions (remote water resources and altitude of the supply area) and the lack of alternative solutions.

In the case of Midar and the adjacent centres in which ONEE also ensures the distribution of water, the collection rate is good at 98 %. Technical and non-technical unaccounted for water in these areas are 27.9 % on average and have improved slightly since the final inspection, yet they are still assessed as elevated. Taking a closer look at the individual centres, Midar and Tafersit are above the project target of 30 %, at 35 % and 31 % respectively. The unaccounted for water in the project WWs was low at 2.4 % (Tangier), 2.7 % (Rabat) and 3.9 % (Nador). On the whole, ONEE's commitment to reducing water losses is evident and can be seen in the improved layout of water meters and flow meters in the transport and distribution system, among other measures. In addition, an FC programme to reduce losses has been ongoing since 2007.

Particularly given that the supply has been secured or improved for a relatively large target group in relation to the funds used, the efficiency is considered satisfactory.

### Efficiency rating: 3

#### Impact

The definition of the programme's ultimate objective was aimed at contributing to the reduction of health risks from water-borne diseases for the population in the supply regions. By today's standards, the ultimate objective of the programme would have been expanded to include the improvement of living conditions for the population benefitting from the programme.

No indicator was originally defined for the achievement of the ultimate objective. This makes it harder to conclusively assess the achievement of the ultimate objective. Moreover, no data was available on the incidence of water-borne diseases in the Midar region prior to the implementation of the programme. The achievement of the ultimate objective can thus only be estimated indirectly using (i) the uninterrupted availability of drinking water and (ii) the impeccable quality of the water distributed. With regard to the implemented water treatment facilities, it is evident that an uninterrupted supply of drinking water has, in principle, been achieved. In terms of the new distribution system for Midar and the adjacent centres, it can be assumed that the creation of household connections and the supply of drinking water of impeccable quality has improved the living conditions of the population. This positive assessment, however, is marred by the growing use of private tanks in which the water quality cannot be monitored. It was not possible to conclusively determine whether or not the water from these tanks is being used as drinking water. In principle, there is a risk that water quality deteriorates within the household.

In light of the correlations described above, it can be assumed that the developmental impacts were as anticipated.

**Impact rating: 2**

### **Sustainability**

The maintenance and operation of the supply systems are well organised by ONEE. The operation of the facilities is ensured by ONEE's own staff. Maintenance and repairs are performed by authorised specialist companies and monitored by ONEE personnel. The ONEE regional directorates draw up annual programmes for the maintenance of the equipment in the facilities which are in line with ONEE internal standards. All facilities visited were in good or satisfactory condition. However, there is clearly room for improvement in the area of preventive maintenance. With regard to system overloads, Midar and adjacent centres can expect less strain in the network in the future. The site visit gave the impression of sufficient staff levels and appropriately qualified personnel in the five centres and at the other programme locations.

The reservoirs fall under the supervision of the administration department in charge of the respective catchment area, which is responsible for their sustainable management. This management occurs on the basis of what are known as usage plans. The volumes taken from the reservoirs for the drinking water supply are always agreed upon in detail between ONEE and the responsible administration department of the respective catchment area and are subject to monitoring. Secure access to the water can thus be assumed, particularly as the extraction of drinking water has been given priority according to ONEE.

The introduction of a pipeline-based drinking water supply should always be accompanied by the parallel introduction of adequate waste water disposal. It was proposed that waste water systems for the water supply in Midar and the adjacent centres involved in the programme would be available and in operation 5 years after the completion and operation of the drinking water supply at the latest. At the time of the current evaluation (10 years after completion) however, only one of the five centres (Ben Taieb) plus Zaio are connected to a waste water system. Construction work is currently underway to establish the waste water systems for Midar and Driouch. Obvious health hazards could not be identified in the context of the site visits.

ONEE can be described as a professional and competent partner. In terms of financial sustainability, however, it should be noted that there are definite risks over the medium and long-term. Thus for example, the recovery of operational costs for drinking water distribution in the respective centres (Midar and adjacent centres) is inadequate. Cross-subsidisation, however, is possible and the recovery of operational costs for the "water" business area has been positive in the past (current figures are not yet available). Furthermore, in the framework agreement for the period 2014 to 2017, ONEE agreed with the Government of Morocco on appropriate adjustments to the water and waste water tariffs, and the company is making visible efforts to improve the efficiency of its operations. It already proved possible to implement the first tariff adjustments in August 2014 and January 2015, which helped improve ONEE's earnings situation and also allowed for fairer contribution payments with regard to the protection of poor sections of the population. It can be assumed that the Moroccan government will continue to provide adequate subsidies for drinking water supplies in future, as has been the case in the past.

The overall sustainability of the programme can thus be assessed as good.

**Sustainability 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:

<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).