Turkey: Sanitation facilities for Malatya

Ex post evaluation report

OECD sector	14020 / Water supply and sanitation – large systems	
BMZ project ID	(1) 1998 67 128 (fixed asset investment) (2) 2001 70 357 (accompanying measures)	
Project executing agency	Malatya City Council	
Consultant	Dorsch-Consultant – Su Yapi	
Year of ex post evaluation report	**2009**	
	Project appraisal (planned)	**Ex post evaluation (actual)**
Start of implementation	Q2 2001	Q3 2002
Period of implementation	27	30
Investment costs	(1) EUR 59.82 million (2) EUR 1.02 million	(1) EUR 43.62 million (2) EUR 1.00 million
Counterpart contribution	(1) EUR 35.36 million (2) -	(1) EUR 20.44 million (2) -
Financing, of which FC funds	EUR 24.46 million	EUR 23.18 million
Other institutions/donors involved	-	-
Performance rating	3	
• Relevance	3	
• Effectiveness	2	
• Efficiency	3	
• Overarching developmental impact	2	
• Sustainability	3	

Brief description, overall objective and project objectives with indicators

The Malatya sanitation project consisted of installing a sewerage network in Malatya-West, constructing a main sewer that leads to the waste water treatment plant, implementing the first expansion package for the central treatment plant for 720,000 inhabitants, delivering basic equipment for start-up operations and providing consultancy services for the implementation of the project. In addition, a number of accompanying measures were carried out to integrate the project infrastructure into existing operations and adjust the operating environment to the new requirements. The project objective was to make sure that waste water from the City of Malatya and its neighbouring municipalities would be disposed of without any environmental and sanitary risks. The project aimed to help purify local surface waters (including a reservoir and its tributaries in the project area) and improve the sanitary and socio-

economic conditions for the region's inhabitants (overall objectives). As part of this ex-post evaluation, the overall objectives have been redefined as helping to "*purify local surface waters (including a reservoir and its tributaries in the project area) and reduce health risks for the region's inhabitants*".

The following indicators were defined to track the project objectives:

- One year after the commissioning of the treatment plant, all visible sanitary evils in the western part of the city will have been dealt with (e.g. stagnant sewage ponds).
- Waste water will no longer be regularly discharged into the tributaries of the Karakaya reservoir (no more sewage outlets).
- The waste water load (BOD_5 load) will be reduced by at least 90%.
- The quality of the effluents from the treatment plant will comply with the local regulations for discharges into stagnant waters (< 18 mg N/l).

In addition, this ex post evaluation has introduced the following indicator:

- The connection rate of the sewerage network in the project area will be 95%.

The project did not define any overall objective indicator.

Project design / major deviations from the original project planning and their main causes

The project aimed to connect nearly all inhabitants of Malatya and a major part of the population of the surrounding municipalities to the sewerage network and treat their waste water properly. The central treatment plant was designed with a view to meeting the city's long-term needs (up until 2030) and was to be expanded in three phases. This project covered only the first expansion phase up until 2010.

In line with the agreement, the treatment plant was designed as an activated-sludge plant for low contaminated sewage. Currently, the facility is run by a private operator in a largely professional manner.

Even at peaks, actual pollution loads amount only to 60% of the project forecast. While the plan assumed that 720,000 inhabitants would have to be covered by 2010, only some 460,000 inhabitants had been connected by 2009. This means that the demographic trend was overestimated in the planning assumptions. Also, during the summer months farmers illegally tap untreated waste water from the main sewer that leads to the treatment plant and use it for irrigation. During that period, the quantity of waste water received by the treatment plant is reduced to a mere 25% of its average capacity. As the received waste water amount and the pollution load is substantially lower than the rated capacity, some of the aeration tanks are regularly out of service.

However, the hydraulic capacity of the treatment plant is fully used in normal operation, which is due to a very high inflow of outside water. Besides the illegal cases of waste water tapping along the main sewer, the state of repair of the sewerage network is one of the most urgent issues in Malatya's sanitation system.

The sewage sludge is drained mechanically. According to the critical sludge parameters, it is safe and can be used in agriculture. This method is exemplary by Turkish standards.

The accompanying measures included establishing a sanitation department within the executing agency, introducing modern finance management systems and the aforementioned sludge disposal concept, and setting up an environmental monitoring body. Most of objectives related to the accompanying measures were achieved, particularly as regards appropriate disposal of the sewage sludge.

The project budget was underspent by approximately 25%. This was mainly due to substantial cost savings during the construction of the main sewer and the sewerage network in the western part of the city, where the cost estimates had been very conservative to allow for prevailing uncertainties and where keen competition helped keep the actual costs below the estimates.

Key results of the impact analysis and performance rating

The construction of the project infrastructure has made it possible to collect the waste water from the project area and channel it to the treatment plant. As a consequence, the identified sanitary evils have been dealt with and the population's contact with untreated waste water has been reduced. This has significantly diminished the risk of water-induced diseases. However, an unintended side effect of the measure is that farmers break open the main sewer to tap waste water for irrigation purposes. This reduces the project's positive health effects for farmers and, to a lower extent, also for consumers. In most cases, waste water is no longer discharged into the surrounding rivers. Therefore, the pollution of surface waters (including the Karayaka reservoir) has diminished although the river Bahbutu continues to be polluted by waste water.

Both women and men are benefiting from the project to the same extent. Yet the municipal sanitation project was not geared to promoting gender equality, and it did not offer any potential to advance this goal.

In terms of development policies, the sewerage system and the waste water treatment plant have removed an important bottleneck. The project's design and sector approach were in line with the development strategy of the Turkish government, the focal points of German-Turkish cooperation and the EU's acquis communautaire and contributed to the Millennium Development Goals. In factual terms, the underlying assumptions of the action chains were correct. However, there are reservations to be made regarding the project design. As the project appraisal report did not examine the origin of outside water flows to the treatment plant and failed to propose ways to eliminate them, this had an impact on the design of the treatment plant and its operations. What is more, the accompanying measures did not sufficiently consider the operation and maintenance of the sewerage network. Direct cooperation at the municipal level with the financial involvement of Iller Bank is in line with Turkey's customary structures and procedures. The effectiveness of the development project is not adversely impacted by other policy fields or by the policies of other donors. On the contrary, KfW's sanitation approach in some cases even serves as a role model, for instance, with regard to the EU's environmental policy priorities. However, there continues to be competition regarding the granting terms of EU funds and loans from other donors. Due to design-related constraints, the relevance of the project is rated as satisfactory (sub-rating 3).

The projective objective was appropriate. The project measures – and favourable conditions – helped achieve most of the project indicators. Thanks to the sewerage network financed by Iller Bank, all sanitary issues in the western part of the city have been resolved and the rivers Boran and Aydagan are no longer contaminated by regular discharges of waste water. However, untreated industrial effluents continue to be discharged into the river Bahbutu. Indicators to measure the reduction of the pollution load show an excellent performance. The quality of the treatment plant's effluents is < 18 mg N/l and the connection rate of the sewerage network is 95%. Therefore, the effectiveness of the project is still rated as good (sub-rating 2).

The specific investment costs were below the level of comparable measures in the region. In terms of pollution load, the waste water treatment plant is obviously oversized; in terms of waste water volumes it is working to capacity, but only due to the high proportion of outside water. With the benefit of hindsight, it would have made sense to reduce the size of the treatment plant (saving approximately 5% to 10% of the

costs) and finance specific measures instead to identify and reduce the inflow of outside water into the sewerage system. Collection efficiency is running at a modest 69%, while water losses amount to some 50%. This is why the production efficiency is rated as satisfactory. As collection efficiency is modest and operating costs are barely covered, allocation efficiency is no more than satisfactory. In view of that, the efficiency of the project is rated as satisfactory (sub-rating 3).

The overall objective was achieved to a limited extent. As untreated waste water is used for irrigation, health risks persist for a small part of the target group (particularly farmers). The river Bahbutu continues to be polluted by untreated waste water. Yet it is fair to say that the water quality has improved in two out of the three tributaries in the project area and in the reservoir. Another positive aspect is that this year tighter legal regulations and more intense enforcement have reduced the number of cases where the main sewer was forced open to illegally tap untreated waste water. The use of sewage sludge, particularly for agricultural purposes, is exemplary. This concept could also serve as a model for other Turkish cities. For the reasons stated above, the overarching developmental impact is still rated as good (sub-rating 2).

As some defects have been identified in the sewerage network, there is a risk of new sanitary issues occurring in the project area in the medium to long term. So far, the private operator has been running the treatment plant in a largely professional manner. However, the operations contract will soon be put out for tender again, and as in other water supply and sanitation fields, there is a risk of a municipal operator winning the contract, which could jeopardise proper operation of the facility. In terms of pollution load, the waste water treatment plant will not reach full capacity utilisation by the end of the time horizon for the current expansion phase. But if the inflow of outside water into the sewerage system is not significantly reduced, the treatment plant's hydraulic capacities will have to be expanded. If MASKI's expenses for operating and maintaining the water supply and sanitation systems were to increase to the required level, the costs could barely be covered by current water revenues. Therefore, there is a potential risk that major repair work is left undone for cost reasons. In view of that, the sustainability of the project is rated as satisfactory (sub-rating 3).

Considering the individual evaluation criteria discussed above, the overall performance of the project is rated as satisfactory (rating 3).

General conclusions and recommendations

The project was focussed on waste water treatment, ignoring inflows of outside water, although this problem was known at the time of project appraisal. As the quantity of outside water may have a significant impact on capacity planning and on the operations of the waste water treatment plant, it would have been advisable to examine the origin of high inflow quantities and discuss ways to curtail them.

In addition, it has become clear that the treatment plant is severely oversized with regard to the pollution load it has to handle, due to inaccurate assumptions about population size and growth. This is a case in point that demographic estimates need to be as exact as possible to determine the optimal size of waste water treatment plants and of the facilities and systems in general.

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

Projects are evaluated on a six-point scale, the criteria being relevance, effectiveness (outcome), "overarching developmental impact" and efficiency. 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 rating that clearly exceeds expectations

2 Good rating fully in line with expectations and without any significant shortcomings

3 Satisfactory rating – project falls short of expectations but the positive results dominate

4 Unsatisfactory rating – significantly below expectations, with negative results dominating despite discernible positive results

5 Clearly inadequate rating – despite some positive partial results the negative results clearly dominate

6 The project has no positive results or the situation has actually deteriorated

A rating of 1 to 3 is a positive assessment and indicates a successful project while a rating of 4 to 6 is a negative assessment and indicates a project which has no sufficiently positive results.

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 an improvement is very unlikely. 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. A rating of 1 to 3 indicates a "successful" project while a rating of 4 to 6 indicates an "unsuccessful" project. In using (with a project-specific weighting) the five key factors to form an overall rating, it should be noted that a project can generally only be considered developmentally "successful" if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are considered at least "satisfactory" (rating 3).