

Palestinian Territories: Sewage Disposal in Al-Bireh City and Upper North District

Ex-post evaluation report

OECD sector	14030/Basic drinking water supply and basic sanitation	
BMZ project ID	a. 1995 67 058 and b. 1998 65 700	
Project executing agency	Al-Birch municipality	
Consultant	Dr Dahlem, Essen/ CEC Amman	
Year of ex-post evaluation report	2008	
	Project appraisal (planned)	Ex-post evaluation (actual)
Start of implementation	a. Q 4 1996 b. Q 1 1999	a. Q 1 1998 b. Q 2 2000
Period of implementation	a. 27 months b. 18 months	a. 27 months b. 50 months
Investment costs	a. EUR 11.5 million b. EUR 3.8 million	a. EUR 9.9 million b. EUR 4.7 million
Counterpart contribution	a. EUR 0.5 million b. EUR 0.7 million	a. EUR 0.5 million b. EUR 0.8 million
Finance, of which FC funds	a. EUR 11.0 million b. EUR 3.1 million	a. EUR 9.4 million b. EUR 3.9 million
Other institutions/donors involved	GTZ	GTZ
Performance rating	3	
• Relevance	2	
• Effectiveness	3	
• Efficiency	3	
• Overarching developmental impacts	3	
• Sustainability	3	

Brief Description, Overall Objective and Project Objectives with Indicators

The programme comprised the extension of the sewage system and the construction of a central sewage plant in Al-Bireh for a population equivalent of 50,000. The objective of the main (and complementary) FC project was the ecological and hygienic disposal of sewage from Al-Bireh and its Upper North District. The indicators for project

objective achievement were the percentage of connections in the population, sewage plant capacity utilisation and sewage treatment grades. The overall objectives were:

- Contribution to conserving regional water resources
- Reduction of health hazards for the population in Al-Bireh

No indicators were defined for the overall objectives. The target group was not confined to the population of Al-Bireh but also included the whole population in the surroundings who obtain groundwater from deep wells and the population of the Jericho region, whose water is supplied from endangered groundwater and spring water reserves.

The project was carried out and evaluated in cooperation with the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). As part of Technical Cooperation, GTZ supported the municipal authority in setting up a separate department for sewage disposal, trained the personnel and procured and financed vehicles and equipment.

Project Design/Major Deviations from Original Planning and Main Causes

The extension of the sewage pipelines primarily connected two districts of the rapidly expanding city of Al-Bireh to the existing sewerage system. The grid extension proceeded largely to plan. The construction stop due to the invasion of Israeli armed forces, protracted curfews, coordination problems and capacity bottlenecks with local building contractors incurred considerable delays and higher costs.

The sewage treatment plant (planned as a two-stage aeration and trickle filtration facility for a population equivalent of approx. 50,000 with a capacity 7,500 m³/d), was tendered as a turnkey construction project. The treatment process finally applied differed from the original plan (single-stage low-load plant with simultaneous sludge stabilisation). The original requisite treatment capacities were retained throughout. The decisive factor for this change in design were substantial investment cost savings and the simpler operational management of the technical facilities.

Altogether, the layout of the grid and treatment plant can rate as adequate. The actual demographic development, percentage of mains connections and dirt load approximate the forecast figures for this. Constructing the sewage treatment plant with two aeration basins has proved worthwhile, because it saves the electrical energy needed for the initial operation of only one basin. Since January 2005, the central control of the treatment plant has been inoperational, so that the sludge press has only been put to limited use.

The original project design also provided for laying a pipeline to transport the treated sewage to an ecologically less sensitive neighbouring valley and the construction of a

storage basin there. A follow-on project was planned for agricultural irrigation. This subcomponent was not implemented as the scheduled construction sites have been made inaccessible since project appraisal due to the expansion of Israeli settlements and the heavy restrictions on access roads. As rainfed cropping is the main form of cultivation in the region, this would also require prior conversion to irrigation farming in order to use the treated sewage for agriculture.

Key Results of Impact Analysis and Performance Rating

Relevance: Under the present circumstances in the project region, the overall objectives of protecting regional water resources and mitigating health risks to the population of Al-Bireh still address a core problem and are still of high relevance. The chosen approach (expansion of the sewerage system, erection of a mechanical-biological sewage plant, setting up a sewage operation unit, introducing a tariff system, training of experts) can still rate as appropriate. It is also in keeping with the priorities of the Palestinian Territories. With its effect on improving health and the sustainable use of natural resources, the project makes a contribution to attaining the Millennium Development Goals. The relevance of the cooperation project is rated as good (rating 2).

Effectiveness: The indicators set pertain to the project impacts. The capacity utilisation target for extending the sewerage system was connecting 85% of the population by 2005 and 90% by 2010. With actual mains connections of 79% in 2008, the project only fell short of the target by a small margin. The sewage treatment plant has been in continuous operation since mid-2000 and has maintained the anticipated mechanical treatment capacity throughout the whole period. Except for a 15-month period, the biological purity threshold was more or less met. Another purity grade is the separation of suspended solids. It has not been measured for 7 years for lack of suitable filter paper. Measurements by the local university found it had been exceeded, but visual inspection by the expert consultant indicated compliance at evaluation.

The major defect in sewage purification is the unsatisfactory elimination of stabilised sludge. As the automatic control of the sludge press has been out of operation since January 2005, the facility has had to be operated by hand. As a result, only about 33% of the sludge is dehydrated and deposited at the waste disposal site and about 67% is conduited in a moist condition into the river bed near the outlet for treated water. This renders a large part of the biological purification ineffective because the pathogens contained in the sludge and the nutrients re-enter the clean water. Taking the whole service period into account, however, the pressing plant was in operation from mid-

2000 to January 2005 and the mayor has given verbal and written assurance to employ two additional technicians at the treatment plant, who can operate it by hand in the short term. The municipality of Al-Bireh and KfW have also agreed to repair the facility with the available residual KfW funds and lay out drying beds as a longer-term solution for dehydrating the sewage sludge. Effectiveness for the entire service period is therefore assigned the rating 3.

Overarching developmental impacts: As to the first overall objective of contributing to the conserving regional water resources, a prime question is whether the purification capacity of the sewage plant meets requirements so that the treated water can be used as a drinking water resource further down the valley. Considering effectiveness as rated above, the initial operating years of the treatment plant and pledged future commitments by the Al-Bireh municipality and KfW, this is realistic in the estimation of the expert consultants.

Reducing health risks for the population in Al-Bireh (2nd overall objective) is still plausible as the hazards of overflowing soakaways and contamination through the evacuation and transport of sewage have been reduced. However, this cannot be verified with the current health statistics, which only cover a few years and cannot ascertain a trend (Overarching developmental impacts: rating 3).

Efficiency: The grid and sewage plant layout as well as the investment costs can rate as appropriate in all. The specific connection costs (excluding household connection) for Upper North District are, however, high. The dynamic prime costs per cubic metre of transported and treated sewage amount to EUR 1.13 for full costs and EUR 0.24 for operating and maintenance costs. Considering the topographical situation of Al-Bireh and the wages and incomes of the population, these are reasonable. As part of Technical Cooperation, an operational division for sewage was set up, a sewage charge introduced and personnel trained to a satisfactory standard. The sustainable capacities built up and the know-how imparted by the long-term and short-term experts warrant the total input of 114 expert-months. The type and amount of material and equipment procured were also adequate. The changes in treatment plant design at the beginning of the cooperation project, however, rendered some of the planning input superfluous. Measured against all the measures to promote the executive agency, this makes for a relatively high resource input (rating for efficiency: 3).

Sustainability: Only about 50% of operating and maintenance costs are met, with the customers connected to the sewage grid bearing approximately half and the other half financed from the general municipal budget revenue. One reason for the low revenue from rates, which only meets about 25% of operating and maintenance costs, is that not all drinking water customers (only 79%) pay for the costs of the sewerage grid and

sewage treatment. Secondly, at an average of about 60%, collection efficiency in sewage is far too low and third, the charges are not high enough. At least the operation and basic maintenance of the grid and sewage plant have been ensured by replenishing the current rates revenue with general municipal budget income since 2000. Costly repairs, reinvestments or spare parts have not been financed, with the consequence that considerable operational deficits are already evident. The situation will improve thanks to the increase in sewage charges in 2008 and the planned joint billing for water supply and sewage. The considerable operational deficits ascertained can be remedied in all likelihood.

Despite the shortcomings, the grid and sewage plant have operated without interruptions. Routine upkeep is carried out. Periodical maintenance poses a problem, due to the higher financial cost. Although personnel capacity in mains operation can rate as adequate, one mechanic and one worker are too little for the treatment plant. Although the workload has increased due to the increasing need to repair machines and pumps, personnel at the treatment plant site has been reduced. Already cited as a risk in project appraisal, this has actually occurred in the treatment plant. The municipal authority has promised to assign two more technicians to the sewage plant. In the opinion of the expert consultants, it can only be sustained if the remaining FC funds are allocated for sludge drying. Since the costs for sewage grid maintenance are lower and the grid is assigned higher priority, Al-Bireh can also be expected to maintain it on its own in future, despite the deficits (sustainability: rating 3).

Altogether, we assess the project as satisfactory (rating 3).

General conclusions

Mechanical plants should always be designed for easy manual operation in addition to automatic control where considered necessary. In the present project, the automatic operation of air supply to the aeration basins and the sludge press failed, causing serious operating problems.

Where policymakers are unlikely to set cost-effective rates and make arrangements for their collection, the issue of cost recovery should be addressed openly at project identification or appraisal. Where high priority is attached to the project, the German Federal Government and the government of the partner country should already make a joint decision during project preparation on the percentages of running costs to be financed by each side and for how long.

Notes on the methods used to evaluate project success

Assessment criteria

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

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

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

Rating 1	Very good sustainability	The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.
Rating 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.)
Rating 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.
Rating 4	Inadequate sustainability	The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and an improvement that would be strong enough to allow the achievement of positive developmental efficacy is very unlikely to occur. This rating is also assigned if the developmental efficacy that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

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 above focus on the following fundamental questions:

Relevance	Was the development measure applied in accordance with the concept (developmental priority, impact mechanism, coherence, coordination)?
Effectiveness	Is the extent of the achievement of the project objective to date by the development measures – also in accordance with current criteria and state of knowledge – appropriate?
Efficiency	To what extent was the input, measured in terms of the impact achieved, generally justified?
Overarching developmental impact	What outcomes were observed at the time of the ex post evaluation in the political, institutional, socio-economic, socio-cultural and ecological field? What side-effects, which had no direct relation to the achievement of the project objective, can be observed?
Sustainability	To what extent can the positive and negative changes and impacts by the development measure be assessed as durable?