Kenya: Sewage Disposal Eldoret

Ex post evaluation

OECD sector	14020 / Social infrastructure	
BMZ project ID	1994 65 899	
Project-executing agency	Eldoret Water and Sanitation Company, Ltd. (ELDOWAS)	
Consultant	DAR, Wiesbaden	
Year of ex-post evaluation	**2008**	
	Project appraisal (planned)	**Ex-post evaluation (actual)**
Start of implementation	1st quarter 1995	1st quarter 2001
Period of implementation	54 months	41 months
Investment costs	EUR 14.6 million	EUR 14.3 million
Counterpart contribution	EUR 1.3 million	EUR 1.0 million
Financing, of which FC funds	EUR 13.3 million	EUR 13.3 million
Other institutions/donors involved		GTZ (as of the end of 2001)
Performance (overall rating)	4	
• Relevance	3	
• Effectiveness	4	
• Efficiency	5	
• Overarching developmental impacts	4	
• Sustainability	3	

Brief description, overall objective and project objectives with indicators

The project comprised two components aimed at improving the sewage disposal of the town of Eldoret with a population of 272,000. One measure was to expand the sewerage system, another to build a new mechanical-biological sewage treatment plant and to rehabilitate and enlarge an existing sewage treatment plant. Project objectives were the enhanced central sewage disposal of those parts of Eldoret which had been connected to the water supply system in the previously implemented water supply project, as well as the improvement of sewage treatment and thus of the water quality of the receiving waters, the Sosiani River. The overall objective was to contribute to protecting surface waters and to reducing health hazards for the population connected to the supply system as well as for the people living downstream. Overall objective and project objectives were to be considered as fulfilled if the following indicators were achieved in the year 2005:

1. at least 4,900 connections to the sewerage network;
2. increase in the number of inhabitants connected to the sewerage network to 74,000;
3. volume of sewage treated of 15,000 m^3/day on average;
4. biological oxygen demand (BOD) of the sewage treatment plant effluent of no more than 30 mg/l.

The target group was defined as the entire population of Eldoret and the people living in the villages further downstream. Project executing agency was the Eldoret Water and Sanitation Company, Ltd. (ELDOWAS).

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

The project included the expansion of the sewage disposal by means of:

- Replacement and in some cases relocation of existing sewage collectors,
- Installation of a new central collector as well as of main and secondary collectors,
- Repair of the existing sewage treatment plant and expansion of its capacity,
- Construction of an additional sewage treatment plant,
- New equipment for and extension of the central laboratory, and
- Consulting services for detailed planning and construction supervision

The successful establishment of an operating company for the urban water supply and sewage disposal systems in Eldoret that is managed according to economic principles was a prerequisite for the project's sustainability. With considerable delay, the town of Eldoret founded the independent operating company ELDOWAS for its drinking water supply and sewage disposal in the year 1997. It was not until 1999 that the company started operating with the staff transferred to the company from the urban authorities. Additionally, there were delays in the construction work due to financial difficulties of the building contractor, as well as administrative delays owing to the change in government, so that all in all the project started six years later than planned. The foundation and establishment of the operating company ELDOWAS was considerably supported by a Technical Cooperation (TC) project that provided advice on the urban water sector.

Key results of the impact analysis and performance rating

In 2008, the overall number of connections amounted to ca. 11,000, thus considerably higher than the target value. However, connections exceeded the target value before the project measures had even been started. It must be assumed that the project itself contributed considerably less to the increase in connections to the sewerage network, since the construction of house connection pipes was mainly carried out in the poor

areas of Kamukunji and Huruma, which have a connection rate of merely 4-5%. Some of the remaining pipes are feeder mains without house connections, or collectors, again with only few house connections. Most new connections were installed in the town centre, which had been developed at an earlier stage and where only few pipes were laid with project financing. Project measures accounted only to a rather minor extent for the new connections in this area.

The actual volume of sewage treated at the treatment plant in 2008 amounted to ca. 11,000 m³/d. Included in this figure was a large amount of extraneous water. Taking this aspect into account, the volume of sewage with an ordinary biological content is calculated at ca. 8,000 m³/d, which is clearly below the project's target value of 15,000 m³/d (corresponding to 83% capacity utilisation). The actual capacity utilisation was therefore only ca. 61% (in relation to the entire flow-through volume) or 44% (in relation to the pollutant load, which determines the cost of building the sewage treatment plant). The reasons for this capacity utilisation deficiency were much lower per capita consumption of drinking water and a lower rise in industrial sewage than had been expected. The project's target value with regard to the effluent quality (pollutant load) of the treated sewage (max. 30 mg BOD5/l) was fulfilled.

The overall objective of the project focused on environmental and resource protection. The population did not really benefit from the installation of the sewerage network in the poor quarters because there are hardly any house connections in these areas. The project had no immediate poverty relevance. If any, there was probably only a minor reduction of water-induced diseases. However, the project aimed at alleviating the work of women associated with nursing the sick. Along with the previous projects and in the context of sector reforms, the project promoted the further development of the operating company ELDOWAS.

The project's objectives are relevant and correspond to the priorities of Eldoret. For decades, the water sector has been a priority of German Development Cooperation with Kenya. From today's perspective, the core problems have only been tackled in part. Insufficient sewage disposal in Eldoret was the focus of the project work but the pollution of wells through nearby latrines as well as the pollution of surface waters with rubbish and leakage seeping from this rubbish were not taken sufficiently into account. It would have been better to modify and expand the project's objective to reducing the health hazards in Eldoret and protecting surface waters. Relevance is therefore assigned the rating of 3.

One of the objectives for the project's sewerage network component was an increase of connections up to 4,900 by the year 2005. However, of the approx. 11,000 new connections in 2008, only a small percentage can be attributed to the project, because

the majority of new connections are in the town centre, which had been developed at an earlier stage. The sewage in the sewage treatment plant contains large volumes of extraneous water. If this aspect is taken into consideration, the plant's actual capacity utilisation amounts roughly to only 44% (see above). The project's target value with regard to the pollutant load of the treated sewage (max. 30 mg BOD5/l) was fulfilled. Effectiveness is therefore given the rating of 4.

Before the project was launched, the sewerage network had a length of 92 km, to which another 55.3 km were added under the project. Around 24.4 km (44%) were installed in the poor quarters of Eldoret, where there were and still are hardly any water flush toilets. In the newly developed poor quarters only 203 property owners got connected to the sewerage network between January 2004 and August 2008 (connection rate: 4% - 5%). It is impossible to determine the exact figure of new connections for the remaining sewerage network, since there are both old and new pipes, but the number of new connections is also rather limited. Specific connection costs are therefore very high. Using pond treatment plants with trickling filters is technically appropriate and incurs very low operating costs. At the time of project appraisal, the sewage treatment plant was expected to have a utilisation capacity of 80% in 2005. Yet current capacity utilisation ranges around 44% only. This leads to high specific investment costs. In retrospect, an expansion in several stages would therefore have been more sensible. The decision to increase tariffs by up to 100% will make it possible to cover the dynamic operating costs, but not the entire generation costs. Efficiency is given the rating of 5.

Viewed out of context, the project had a positive effect on the water quality of the Sosiani River due to the sewage treatment. However, the following external factors heavily pollute the water and thus counteract the project's impacts:

- leachate from the unofficial rubbish dump (the only one in Eldoret) situated on the riverbank opposite the sewage treatment plant seeping into the river; and
- uncontrolled sewage from latrines mixed with rain water.

The receiving waters (Sosiani River) are therefore still strongly polluted downstream of the sewage treatment plant. As a consequence, it is not very likely that the health hazards for the population of Eldoret and for the people living downstream are significantly reduced owing to the project. Overall, the project has hardly any effect on the protection of surface waters and public health. The overarching developmental impact is therefore given the rating of 4.

With regard to finance and general administration, ELDOWAS performs well as a project-executing agency. Its financial situation will be improved considerably by the announced doubling of water and sewage tariffs. However, maintenance of the

sewerage network shows severe defects and was limited to eliminating immediate emergencies. Although it would have been possible, no - urgently required - rinsing equipment has been procured. Altogether, there are high risks to sustainable operation of the sewage treatment plants. Profits will be primarily used to extend the supply of drinking water, as has been the case so far. The sewage treatment plants are currently operating appropriately at low operating costs. Sustainability is given the rating of 3.

Due to the above deficits, the project's overall developmental impact is given the rating of 4.

General conclusions and recommendations

When deciding about the technical design of a project, different options should be investigated in order to be able to determine which design is likely to achieve the greatest desired effect at the same cost under technical and economic aspects. In doing so, user-friendly supply and discharge systems enjoying a high acceptance should be chosen. The capacity of the sewage treatment plant could have been expanded in two stages. Both for reducing health hazards and for the protection of the river water, it would have been important to improve rubbish disposal.

At the time of project appraisal, verification of the economic viability should not only include all activities of the project-executing agency, but take into account the project as a whole. A distinct consideration of the expected specific connection costs per household or per person might have led to a different project design.

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 impacts	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?