

**Mali: Water supply Koulikoro II**

**Ex post evaluation report**

<b>OECD sector</b>	14030	
<b>BMZ project ID</b>	1994 65 600	
<b>Project executing agency</b>	Energie du Mali S.A. (EDM)	
<b>Consultant</b>	IGIP/Hydroplan	
<b>Year of ex post evaluation report</b>	<b>2007</b>	
	<b>Programme appraisal (planned) 1994</b>	<b>Ex post evaluation report (actual) 2007</b>
<b>Start of implementation</b>	Q1 1995	Q4 1996
<b>Period of implementation</b>	34 months	57 months
<b>Investment costs</b>	EUR 4.47 million	EUR 3.50 million
<b>Counterpart contribution</b>	EUR 0.13 million	EUR 0.13 million
<b>Financing, of which FC funds</b>	EUR 4.34 million	EUR 3.37 million
<b>Other institutions / donors involved</b>	None	None
<b>Performance rating</b>	3	
• <b>Relevance</b>	2	
• <b>Effectiveness</b>	2	
• <b>Efficiency</b>	2	
• <b>Overarching developmental impact</b>	3	
• <b>Sustainability</b>	3	

**Brief description, overall objective and project objectives with indicators**

Given the population growth and the high consumption of drinking water in the civil service and the army, capacity at the production plants in the existing central drinking water supply system in the town of Koulikoro, which currently has a population of 35,000, was stretched to the limit at the time of the project appraisal in 1994. In addition, a shortage of pipes meant that the areas of Koulikoro being newly built could not be connected to the supply grid. The future drinking water supply in the town had not been secured. The population of the town was therefore at a greater risk of contracting water-induced diseases (such as diarrhoea, cholera, bilharzia, Guinea worm, skin and eye diseases) (core problem).

In the context of the "Water supply Koulikoro II" project, the existing central water supply system was extended and new production and distribution plants were added. The project objective was to ensure that the people living in Koulikoro were supplied with a sufficient amount of safe drinking water all year round and hence to reduce the risk for the people of contracting water-induced diseases (overall project objective).

During project appraisal, it was assumed that the overall objective could only be achieved by simultaneously improving the situation regarding wastewater and refuse disposal in Koulikoro, which threatened to become worse as a result of the increased production of wastewater. Cooperation with GTZ seemed appropriate and, in parallel with the FC measures, GTZ carried out measures to improve wastewater and refuse disposal, to create greater hygiene awareness, to identify house connections and standpipe locations and to improve the operation of standpipes in Koulikoro.

The following indicators (which were to have been fulfilled three years following the start of operation of the upgraded and extended water supply systems) were intended to measure the achievement of the project objective:

- For the urban population, the drinking water connection rate (via house connections and standpipes) is 82% (for an estimated population of 34,000 three years after the start of operation).
- Average per-capita consumption for house connections is 60 l/cd.
- Average per-capita consumption for standpipes is 15 l/cd.
- The volume of water sold daily is 1,900 m<sup>3</sup>.
- Disruptions to the supply are corrected within a maximum of 12 hours.

For the purpose of measuring the achievement of the project objective, in the ex post evaluation the following indicators were also applied:

- The quality of the water provided complies with WHO standards.
- There is sufficient pressure in the pipes to ensure the continuous supply of urban districts located on higher ground.

The recipient of the grant to finance the project was the Republic of Mali, represented by the Foreign Minister. The project executing agency was Energie du Mali S.A. (EDM), which is the state concessionary in charge of producing, transporting and distributing electricity and water in Mali. In the water sector, the responsibilities of EDM are restricted to 16 towns and cities, including the capital city of Bamako and the project town of Koulikoro. The investment costs of the project totalled EUR 3.50 million, EUR 3.37 million of which was financed out of FC grants.

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

Apart from one change in the design of the production plants – the planned extension of the existing waterworks was replaced, following successful drilling, by tapping groundwater and the waterworks were only upgraded – the project was implemented as planned at project appraisal in 1994. The following FC measures were carried out:

- Repair/stabilisation of the intake channel on the river (Niger) and the inlet conduit outside the untreated water pumping station
- Rehabilitation of the untreated water pumping station and installation of two pumps measuring 90 m<sup>3</sup>/h each (operating in alternation)
- Instead of extending the waterworks: Three new deep wells measuring 45 m<sup>3</sup>/h with inspection buildings built; new central inspection and feeding building built; 7 km of delivery conduits built
- Rehabilitation of the treatment and feeding plants, the sedimentation tank, the filter and the clean water tank at the existing waterworks; installation of new pumps (90 m<sup>3</sup>/h), switchboard plants and electro-mechanical equipment
- Rehabilitation of the hydraulic equipment in the existing water tower (400 m<sup>3</sup>) and building of a new 400 m<sup>3</sup> ground reservoir
- Delivery and laying of 24 km of a primary and secondary network and 25 km of secondary distribution pipes; 400 new house connections and 22 new standpipes set up

GTZ carried out numerous training measures to strengthen the technical service institutions in the municipal authorities and private organisations in the fields of wastewater, refuse and rainwater disposal. In addition, studies on improving decentralised wastewater disposal were carried out and model facilities based on the Ecosan concept were built in two households. Furthermore, measures were carried out to create greater hygiene awareness among the population, to identify house connections and standpipe locations and to improve the operation of standpipes. The GTZ measures were carried out during the planning and construction period of the FC

measures (1995-2001). Owing to the very unsatisfactory cooperation with the Koulikoro municipal authority, the TC measures were not completed as originally planned at the end of 2002 but terminated prematurely at the end of 2001.

### **Key results of the impact analysis and performance rating**

The upgraded and extended water supply plants began operating in 2001. All production and distribution plants were ready for operation and in good working order at the time of the final evaluation. The defects noted during the provisional acceptance of the plants in 2001, after the building contractors failed to comply in every case with the requests to exchange or repair parts, were put right by EDM on its own initiative. In terms of technology, staff, administration and finance, EDM is in a position to operate and maintain the water supply system in Koulikoro over the long term. At ex post evaluation, the technical water losses were 8% and the collection rate for the water charges was 95%.

The indicators established to measure the achievement of the project objective (see above) all achieved acceptable values. The volume of water sold in 2005 was 1,040,000 m<sup>3</sup> or 2,850 m<sup>3</sup> per day. 42% of this volume was drawn from house connections and standpipes solely for private use. 9% was used by industry, 49% via connections of the public authorities and the army. The latter figure makes it clear that, as pinpointed during project appraisal, the public authorities and the army waste large quantities of drinking water. However, unlike the situation at the time of project appraisal, the public authorities and the army are now paying their water bills.

According to EDM statistics, at the time of the ex post evaluation around 22,100 people (63.7% of the total population) were supplied with water via 2,210 private house connections and 3,900 people (11.2% of the population) via 26 functioning standpipes. As at project appraisal, it is assumed that roughly 2,200 people (6.3% of the population) have indirect access to drinking water via administrative and military facilities. Overall, 28,200 people are consequently supplied with drinking water, 11,500 (70% of the population) more than in 1991.

Although, at around 50 litres, the per capita consumption in the case of house connections is below the target of 60 litres a day, it is still an acceptable figure. At 27 litres, the per capita consumption in the case of standpipes exceeds the target figure. Disruptions to supply are generally put right within a matter of hours. The quality of the water is checked regularly and is in line with WHO standards. The pressure in the pipes is sufficient to ensure a continuous supply in parts of the town that are located on higher ground.

The TC measures were successful in the field of water supply and have made a substantial contribution to increasing the connection rate as the population increases. During project implementation, 400 new house connections and 22 new standpipes were set up, which is due, inter alia, to the TC advice given to the households when the supply standards were selected (house connections versus standpipes) and to the strengthening of the people's hygiene awareness. As the TC measures intended to improve wastewater disposal were merely pilot projects, the disposal technology developed (Ecosan) was implemented in only two households and was consequently not extended more widely, nothing about the current wastewater disposal has changed compared with the situation at project appraisal. The same applies to rainwater drainage and refuse disposal in the town.

From today's perspective, the key problems in the initial situation (supply shortages and disposal deficiencies) were perceived correctly with the result that the project was also justified in the ex post evaluation. The assumption that the disposal problems would be greatly intensified by the project (without countermeasures) proved not entirely accurate. Although the drinking water supply measures were carried out to roughly the extent planned and were essential in order to avoid supply shortfalls, the

extensive non-implementation of the disposal component did not lead to the feared worsening of the disposal situation. The “natural drainage” provided by crevices in the rock and the slope to the Niger River was greater than expected and proved decisive with regard to the fact that the situation did not deteriorate. The disposal deficiencies nonetheless still represent a potential risk for the health of the population.

All in all, however, the positive impact of the improved drinking water supply on the health of the population clearly overshadows the potential health risk caused by the inadequate disposal situation. Statements by EDM and hospital staff confirm this assessment. Since the new water supply plants began operation there has been a reduction in the incidence of water-induced diseases and there have been no cholera epidemics. The overall project objective has thus been achieved.

In terms of positive socio-economic impacts, it should be pointed out that an additional 11,550 people and a potential 19,750 inhabitants (at the time of the ex post evaluation there were still free production capacities for 8,200 inhabitants) in the town of Koulikoro have been supplied with clean and easily accessible drinking water, health risks have thus been reduced and an obstacle to the further economic development of the city has been removed.

As in Mali women are traditionally responsible for the water supply and for taking care of ill members of the family, they derive a particular benefit from this project. First, because the time needed to fetch water and the work involved in doing so have been reduced (most of the people now obtain drinking water from house connections) and, second, because the risk to the health of the members of the family has been reduced. In addition, the TC project has enhanced the position of women by involving them in the organisation of the standpipes (a large number of the standpipe attendants are women, which gives them an independent income).

As more than 30% of the population of Koulikoro lives in poverty, the people living in the districts connected by the project to the central water supply network are mostly poorer people and a social infrastructure was set up as part of the project, the project had a direct relevance to poverty.

With regard to the sustainability of the impact of the project, the following are the main risks from the current perspective:

- There is still a latent risk of the positive impact of the project being lessened by the inadequate disposal of wastewater and refuse. The health impacts could have been greater if the disposal component had been implemented according to plan.
- The financial situation of EDM makes no provision for the upgrading and expansion investment that will be needed in the future in Koulikoro in order to ensure that all inhabitants have an adequate supply of drinking water.
- The future of EDM and hence the services provided to date are uncertain because of the withdrawal of EDM's private majority shareholder in 2005.
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Taking account of the above-mentioned risks, we have arrived at the following final evaluation of the developmental efficacy of the project:

With regard to the relevance of the project: The aim of the project was to provide safe drinking water for the entire population of Koulikoro and to reduce health risks and thus addressed a key developmental problem in the town. The development of the water sector in Mali still has top priority and is correspondingly anchored in the country's poverty reduction strategy. Owing to the uncertain future of EDM, however, Germany is currently making no new commitments in the area of urban water supply. The chain of impacts of the project was mainly correctly assessed but, with regard to the GTZ component, was not implemented consistently. The chosen technologies can be used properly by the operator and are based on the existing supply system. An intensive

sector dialogue, lead-managed by German Development Cooperation, is taking place. To summarise, we assess the relevance of the project as good (sub-rating 2).

With regard to the effectiveness of the project: The targeted and modified FC indicators of the achievement of the project objective were reached in an acceptable manner and in part exceeded. A large portion of the target group (81%) now has a steady supply of drinking water that is sufficient in terms of both quality and quantity. Owing to the good operation and services to date and the connection capacity for 8,200 households, taking account of the new connections established by the operator even after the start of plant operation in 2001, we consider the effectiveness of the project, despite the water wasted by the public authorities and the army, as good (sub-rating 2).

With regard to the overarching developmental impacts of the project: According to the data, there has been a decrease in water-induced diseases, which is plausibly due to this project. Cholera epidemics have not occurred since the new capacities began operation. Since project appraisal around 28,000 people have been supplied with drinking water from the waterworks, i.e. 70% more than at project appraisal. Without the project, the production capacities would not have been sufficient to supply the population with enough drinking water. The project has no structure-building impacts. As the positive impacts of the improved drinking water supply on the people's health are not neutralised by the negative impacts of the disposal situation, we consider the overall objective to have been achieved and the project to have had a positive developmental impact. However, given the ongoing latent risk to the health of the population, which stems from the still unsatisfactory disposal situation, we assess the overarching developmental impacts of the project (FC and TC components) merely as satisfactory (sub-rating 3).

With regard to the efficiency of the project: Measured in terms of the specific investment costs, the use of funds was acceptable. Although the dynamic operating costs are higher than estimated at project appraisal, compared with similar projects they are at an acceptable level. At 8% at present, the technical water losses are extremely low and, at 86%, the capacity utilisation is good. Overall, we rate the production efficiency of the project as good. The allocation efficiency criterion has been met only in part as, taking account of the good collection rate of between 95% and 116%, only 78% of the dynamic production costs are covered. As full cost recovery in the water sector is a target worth pursuing but is in practice not very realistic, we rate the overall project efficiency as good (sub-rating 2).

With regard to the sustainability of the project: There are limited direct risks for the sustainability of the operation and maintenance of the water supply plants in Koulikoro until the capacity limit has been achieved. The operator does not have the liquidity needed for larger replacement and expansion investments. The relaxed financial situation at the time when EDM was privatised in 2000 has since worsened. In statistical terms as well as at the level of the operating result and overall result, EDM is making losses. Owing to the withdrawal of the private investor in 2005 and the uncertain future of EDM, no forecast can be made about whether operating costs can be covered and full cost recovery achieved and therefore no certain statement can be made about the medium-term risks for the sustainable operation and maintenance of the plants. We therefore assess the sustainability of the project only as satisfactory (sustainability rating 3).

Overall, owing to the limited impacts achieved and the sustainability risk, we assess the project's developmental efficacy as satisfactory (overall rating 3).

### **General conclusions and recommendations**

We have drawn the following conclusions that may be applicable to other projects:

- In FC/TC cooperative projects compliance with the activities provided for in the cooperation agreement must be continuously monitored. If, as is the case in

Koulikoro, the TC component has to be terminated for overarching reasons, it needs to be checked whether – and possibly how – at least the parts of the TC component that are essential to the success of the FC measures can be brought to a meaningful conclusion (e.g. in the context of an FC accompanying measure).

- The “Water supply Koulikoro II” project is an example of how private sector participation can bring about considerable improvements in the technical and administrative operational management (e.g. improvements in the supply, higher collection rates) and hence also in the financial situation of an enterprise.
- The project portrayed also shows clearly that in case of private sector participation a functioning intermediary institutions must mediate between the two contracting parties (state and private sector) with regard to their rights and duties in case of dispute or in the event of breaches of contract.

**List of abbreviations**

FC	Financial Cooperation
TC	Technical Cooperation
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation)
l/cd	litre per capita and day
WHO	World Health Organization

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

Projects are evaluated on a six-point scale, the criteria being relevance, effectiveness, 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 result that clearly exceeds expectations
- 2 Good result, fully in line with expectations and without any significant shortcomings
- 3 Satisfactory result – project falls short of expectations but the positive results dominate
- 4 Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
- 5 Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
- 6 The project has no impact 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 an unsuccessful project.

**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. 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).