Nigeria: Water Supply Birnin Gwari

Ex-post evaluation

OECD sector	14020 / Water supply and sanitation – large systems	
BMZ project ID	1992 65 141 (investment measure) 1992 70 117 (personnel support)	
Project-executing agency	Kaduna State Water Board (KDSWB)	
Consultant	Gauff Consult	
Year of ex-post evaluation	**2005**	
	Project appraisal (planned)	**Ex-post evaluation (actual)**
Start of implementation **a) Investment measure** **b) Personnel support**	a) 4th quarter 1992 b) 2nd quarter 1995	a) 3rd quarter 1995 b) 2nd quarter 1999
Period of implementation	a) 36 months a) 13 months	a) 42 months a) 21 months
Investment costs	EUR 5.9 million	EUR 5.9 million
Counterpart contribution	EUR 1.3 million	EUR 1.3 million
Financing, of which Financial Cooperation (FC) funds	EUR 4.6 million	EUR 4.6 million
Other institutions/donors involved	none	none
Performance rating	4	
• Significance / relevance	3	
• Effectiveness	4	
• Efficiency	4	

Brief Description, Overall Objectives and Project Objectives with Indicators

The project comprised the rehabilitation and extension of the existing water supply facilities of the small town of Birnin Gwari in Kaduna State as well as the improvement of sewage disposal system and the protection of the raw water resources. In the context of a personnel support measure the project-executing agency was to be qualified in the areas of operation, maintenance and commercial and financial management. The target group were the approx. 33.000 inhabitants of Birnin Gwari.

The **project objective** was to ensure the adequate supply of the urban population of Birnin Gwari with hygienically safe drinking water until the years 2005. The **overall objective** was to contribute to reducing water-borne diseases. The following **indicators** were defined to measure the achievement of the project objective: increase in the supply rate to 90%; average per-capita consumption of 37 litres; ensuring uninterrupted operation for 16 to 21 hours; a hygienically safe water quality measured by the occurrence of coliform bacteria, which was defined to be negative in 80% of water samples at the time of the acceptance of construction works. An indicator to measure the achievement of the overall objective was not defined.

Project Design / Major Deviations from the original Project Planning and their main Causes

As one of the project measures the height of the dam of the raw water reservoir was raised in order to ease flood water situations. To improve the water supply situation the pumping station, the water treatment plant and the distribution network were rehabilitated and extended, house connections were equipped with water meters and new water kiosks were established. As regards the sewage disposal component the project comprised the construction of a sewage collection network and two clarifying ponds. The measures were largely implemented in line with the original project planning. The only modification was in the area of sewage disposal: in the course of project implementation it was decided, due to ground conditions, to establish a central sewage disposal system instead of latrines and soakage pits, as originally planned. In addition, the number of water kiosks to be built was reduced.

As regards the personnel support component the project-executing agency was provided with advisory services in the areas of operation and maintenance, including leakage detection, and advice in the commercial field on such topics as billing and collection, dealing with customers, tariff setting and management information system.

The project aimed at establishing a fully functioning water supply system for approx. 33,000 inhabitants and at ensuring the competent operation of the facilities in Birnin Gwari. The water supply system is fully functioning. However, the emergency discharge gate of the dam shows minor erosion damage and is further jeopardized by erosion. Moreover, sludge deposits occurred on the dam, which have to be removed in the near future. However, this does currently not impair the functionality of the supply system. Both problems are to be solved in the next year with funds provided by the World Bank. This is an indication that the operator does not have sufficient liquid funds to implement the required maintenance works on his own and in a timely manner. The leak detection programme conducted in the context of the accompanying measure led to a reduction in technical losses from more than 60% at project appraisal to 43% at the time when the personnel support measure was concluded. The current technical loss rate is 21%, which shows a good technical performance of the operator. As a result of the installation of house connections and standpipes with water meters (coverage rate of 79%) invoices are now mainly based on factual consumption. After the conclusion of the accompanying measure the operator succeeded in continuously improving the rate of connection (60-65%) and the collection efficiency (64%) – though at a still unsatisfactory level.

As a result of the project the production capacity was almost tripled. The capacity utilisation was only 40% in 2004. The low capacity utilisation is due, among others, to the fact that funds are lacking to connect the remaining 35 to 40% of the population which is so far not connected, and to the only modest development of new industries, whose development potential had been assessed too optimistically. However, even given a 100% connection rate of the population and given the current average per-capita consumption of 40l/d for house connections the capacity utilisation would only be 51%. The focus of the FC measure was on the rehabilitation and expansion of the distribution network. The house connections were provided under force account works. From an ex-post perspective and given the mostly very low willingness of the target group to pay it would have been more appropriate to supply larger parts of the population through public standpipes. At the final project inspection the construction of ponds treatment plants and a sewage collection network turned out not to have been the solution best suited to the habits of the population. Thus, it was assessed as useless by the project executing agency and not operated (all the more so since the executing agency is formally not in charge of the sewage disposal). Traditionally, the disposal of faeces has been done through latrines and septic tanks. This did not cause any major ecological or health problems. Overall, the measures were only suited to a limited extent to contribute to solving all problems identified at the time of the project appraisal. Nevertheless, as a result of the measure introduced it was possible to eliminate the problems of a non-continuous water supply, a too low supply of water and a low water quality and the resulting health risks for two-thirds of the total population.

Key results of the impact analysis and performance rating

Given a water supply which is now provided on a regular basis and which is adequate in terms of both quantity and quality (though with certain limitations), it can be assumed that the project has contributed to reducing water-related diseases for part of the population in Birnin Gwari (60 to 65%). The health data provided by the local health centres and the hospital show that the incidence of water-borne diseases in Birnin Gwari is relatively low. Especially when comparing the situation with that of water-borne diseases in rural areas of Birnin Gwari it becomes evident that the situation in the town of Birnin Gwari is clearly better. However, the impacts are somewhat reduced as a result of the low connection rate.

In the project region children and men are in general responsible for fetching water from the standpipes or the dug wells, which means that this measure does not have any positive impact on women. Equally, no improvement of the situation of women was detected in the area of nursing sick family members.

As a result of the increased height of the dam of the raw water reservoir and the emergency discharge the danger of floods does no longer exist. Even though no use is made of the waste water collection pipes and the pond treatment plants the sewage elimination situation does not pose an acute hygiene problem but is considered as causing a potential health risk.

In the framework of the project basic social services were provided that serve to supply a largely poor population with drinking water. In this respect the project had direct poverty relevance.

The project did not aim at participatory development or good governance. The kiosks are commercially operated by private individuals and the population did not have any influence on the operating concept or the tariff system.

The objectives of both projects have been met at different degrees. The targeted connection rate was not achieved. Equally, the project did not have any positive impact in terms of ensuring hygienically safe sewage elimination. Positive results that have to be mentioned are the achievement of indicator values for the per-capita consumption and the operating time. Though the indicator for the water quality was achieved formally, in the most recent rainy season significant coliform pollution of the water were found in more than 20% of the water samples. As important indicator values were not achieved we rate the project's **effectiveness** as slightly insufficient (sub-rating 4).

Nevertheless, it can be stated that both in terms of quality and quantity the drinking water supply has improved substantially for the population (60 to 65% of the target group). This is due to the fact that the supply is now maintained on a regular basis, water rationing is no longer required, no alternative water resources have to be tapped and despite all adversities the water quality is usually much better than at the start of the project. Water-borne diseases, especially diarrhoeal diseases, have become rare in the project region. Though cases of malaria occur at regular intervals in Birnin Gwari, the number of infections is relatively insignificant. The relevance of the project's water-supply component is thus established. On the other hand, the sewage elimination component did not have any positive impact on the achievement of the overall objective and, in retrospect, turned out not to be relevant. As regards the project's significance the picture is mixed, since the share of the population not supplied in the context of the project is still very high, at at least 35%. This part of the population is still subject to particular health risks because people continue to use open and sometimes contaminated dug wells. But the project has also produced positive ancillary effects: Such positive aspects attributable to the project are (i) the establishment of an industry for packaging drinking water and (ii) the fact that due to the dam farmers have larger quantities of raw water at their disposal for irrigation purposes. In this respect the project has positive effects on incomes. On the other hand the financial burden from tariffs, which are partly billed on a lump-sum basis (at least 21% of all invoices), is very high for the population in general and for the customers at the kiosks and the private water vendors in particular and, thus, produced negative income effects. Overall, given the proven positive development with regard to water-borne diseases, we rate the **significance/relevance** of the project as still sufficient **(sub-rating 3).**

The investment costs per m³ of water produced are very high. This has to be seen against the background of sewage elimination facilities that were financed under the project but finally not used, which account for 5% of the total cost. Due to the low capacity utilisation, the currently very low collection efficiency, the statistically very volatile coverage of operating costs, the rate of coverage of dynamic operating costs of only 63%, and the fact that there is no full coverage of costs we rate the efficiency of the project as slightly insufficient (sub-rating 4).

There are sustainability risks due to the low collection efficiency and the ensuing potential liquidity problems, which might jeopardize the operation of the facilities.

In view of the above aspects, we consider the project as having a **slightly insufficient developmental effectiveness (rating 4).**

General Conclusions and Recommendations

If the institutional responsibilities for water supply and sewage disposal do no coincide, all executing agencies in charge have to be included intensively in drawing up the concept for and in the implementation of their respective components. If no implementing structure exists for a specific component such structures have to be newly built up instead of automatically conferring them onto an existing executing agency. Otherwise there is the danger that the structures created will not be operated because the formal institutional responsibility is lacking.

Water supply utilities may suffer substantial revenue losses through flat-rate billing not only because there are no incentives for water consumers to use the water economically but also because neighbours who are not directly connected to the water supply network are also provided with water. This problem should be eliminated through the increased installation of water meters at all house connections.

When establishing (additional) kiosks to supply the population with water is has to be checked (even if at the time of the project appraisal the water supply is already provided through water kiosks) whether the existing operating concept including the tariff structure is reasonable and will be accepted by the users. If necessary, appropriate operating and tariff concepts have to be worked out and implemented when new water kiosks are established.

Legend

Developmentally successful: Ratings 1 to 3	
Rating 1	**Very high or high degree of developmental effectiveness**
Rating 2	**Satisfactory developmental effectiveness**
Rating 3	**Overall sufficient degree of developmental effectiveness**
Developmental failures: Ratings 4 to 6	
Rating 4	**Overall slightly insufficient degree of developmental effectiveness**
Rating 5	**Clearly insufficient degree of developmental effectiveness**
Rating 6	**The project is a total failure**

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 below concentrate on the following fundamental questions:

- Are the **project objectives** reached to a sufficient degree (aspect of project **effectiveness**)?
- Does the project generate sufficient **significant developmental effects** (project **relevance** and **significance** measured by the achievement of the overall development-policy objective defined

beforehand and its effects in political, institutional, socio-economic and socio-cultural as well as ecological terms)?

- Are the **funds/expenses** that were and are being employed/incurred to reach the objectives **appropriate** and how can the project's microeconomic and macroeconomic impact be measured (aspect of **efficiency** of the project conception)?
- To the extent that undesired **(side) effects** occur, are these tolerable?

We do not treat **sustainability**, a key aspect to consider for project evaluation, as a separate category of evaluation but instead as a cross-cutting element of all four fundamental questions on project success. A project is sustainable if the project-executing agency and/or the target group are able to continue to use the project facilities that have been built for a period of time that is, overall, adequate in economic terms, or to carry on with the project activities on their own and generate positive results after the financial, organisational and/or technical support has come to an end.