Ex post evaluation – Benin

Sector: Basic drinking water supply, basic sanitation and waste water management (CRS Code 14030)
Project: CP Water Programme - Programme Eau Potable (PEP): Phases 1a (2002 66 635)*, 1b (2004 65 476) and 1c (2006 65 950)*
Programme executing agency: SONEB and DG Eau

Ex post evaluation report: 2014

		1a (Planned)	1a (Actual)	1b (Planned)	1b (Actual)	1c (Planned)	1c (Actual)
Investment costs** (total)	EUR***	9.20	9.20	9.50	9.50	4.50	4.50
Own contribution**	EUR ***	0.00	0.00	0.00	0.00	0.00	0.00
Funding	EUR ***	9.20	9.20	9.50	9.50	4.50	4.50
of which BMZ budget funds	EUR ***	9.20	9.20	9.50	9.50	4.50	4.50

*) Projects in 2014 random sample
**) Own contributions totalled roughly EUR 1.0 million; the investment cost total rises accordingly across the phases.
*** in EUR million

Description: Phases 1a - 1c of the CP Water Programme combined the previously separate project measures of German DC in Benin's rural and urban water sector into one programme. The urban programme components comprised replacement, expansion and modernisation investments for water supply systems in eight selected secondary towns. As part of the rural framework, central supply systems in larger villages of semi-urban areas were financed along with the installation of foot-operated wells in rural regions and the establishment of latrines in public places and schools. The programme-executing agency for rural measures was the Direction Générale de l'Eau (DG Eau). The urban executing agency was the semi-private water utility Société Nationale des Eaux du Bénin (SONEB).

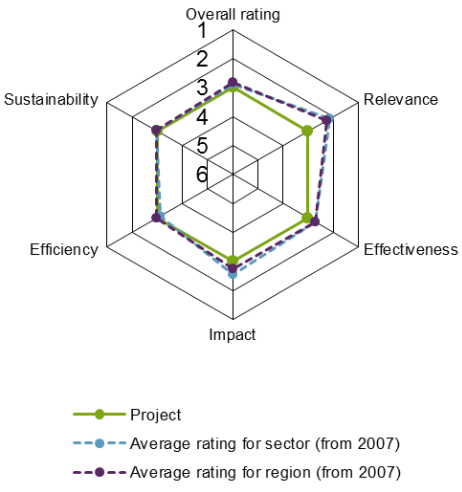
Objectives: The FC module was aimed at improving the water supply for the rural population and those living in medium-sized towns, as well as improving sanitary conditions (programme objective). This was intended to reduce waterborne diseases, save time in collecting water and facilitate more gainful employment and raise school attendance rates, with a view to ultimately making a contribution to reducing poverty (overall development objectives).

Target group: The German contribution to the programme was aimed at the largely poor rural population in the departments of Donga and Atacora as well as the urban population in eight secondary towns.

Overall rating: 3 (for Phases 1a - 1c)

Rationale: While the majority of the financed water supply systems in both rural and urban areas are still operational and used roughly 5 years after commissioning, it remains unclear whether the development policy goals of the project, especially the impacts on health, were fully achieved as recontamination is common during the transport and storage of water. The long-term upkeep of the rural water supply systems is at risk due to the sometimes flawed administration by the communes. The high dependency of Benin's water sector on external financing represents a further risk for the sustainability of the measures.

Highlights: The ex post evaluation benefited from the results of a rigorous German-Dutch evaluation of rural water projects in Benin in 2011.



Rating according to DAC criteria

Overall rating: 3 (for Phases 1a - c)

General conditions and classification of the programme

In 2004, the water programme (Programme Eau Potable - PEP) combined the previously separate measures in Benin's rural and urban water sector (within the framework of the projects "Rural water supply I – IV" and "Water supply in secondary towns") into one programme. PEP I, the first phase of the water programme (2004 - 2009), is then subdivided into three parts, 1 a - c. Projects 1 a and 1 c were included for evaluation in the 2014 random sample. However, as it is not practical to separate the three parts of phase one of the water programme in terms of content, PEP I - 1b was also included in the ex-post evaluation (EPE) and all projects were evaluated together.

Even today, the supply of safe drinking water in Benin is guaranteed for only 65.6 % of the population in rural areas and 68 % of the population in urban areas. In 2006, however, when the water programme was in its development phase, these rates were even lower, at 46 % and 53 % respectively. The section of the population without access to a secure water supply (modern drilled well with foot pump, standpipes or house connection) is reliant on what are known as "alternative" water sources (traditional wells, privately dug wells, pools of brackish water), which are often badly contaminated. As a result, waterborne diseases (particularly diarrhoea, skin irritations and parasites) are widespread and especially dangerous for children.

The programme corresponds to the Water Sector Strategy of the German federal government and those of the partner country. The donors and the Benin government pursued a common policy in the rural water sector by means of the PADEAR programme (Programme d'Appui au Développement du Secteur de l'Eau et de l'Assainissement en Milieu Rural). The objective here was to extend the rural population's access to clean drinking water and sanitation, to further decentralise the operation of the system, and to integrate the private sector into providing services in the areas of maintenance, repairs and the sale of spare parts.

The evaluated water programme (Programme Eau Potable), which was aimed at improving the drinking water supply for the rural population and those living in medium-sized towns as well as improving sanitary conditions, also fits into this framework.

In Benin's urban areas, the commercially oriented, state-owned water company SONEB is responsible for the water supply. In rural areas, DG Eau supplies the population with drinking water. DG Eau is part of the Ministry of Mines, Energy and Water, which also oversees SONEB. Both institutions have regional branches in the capitals of each department.

SONEB and DG Eau use different systems to improve the drinking water supply. While in rural areas DG Eau specialises in decentralised solutions in the form of drilled wells with foot pumps or smaller distribution systems (consisting of a drilled well which is connected by pipeline to a varying number of taps), SONEB endeavours to expand its central supply networks in urban areas and to supply the population by means of taps or house connections.

The quality of the water that SONEB and DG Eau supply to taps or drilled wells is significantly better than the water from so-called "alternative" sources. According to a 2013 investigation by the Ministry of Health, SONEB's water boasts the best quality: only 5.6% of the samples taken from SONEB taps were contaminated with E. coli bacteria. The corresponding values for foot pump wells and standpipes in rural areas were 10 % and 17 % respectively. By contrast, an average of 33 % of private dug wells and 100 % of traditional wells are contaminated with E.coli bacteria.

An evaluation from 2011 involving econometric methods for measuring impacts also draws attention to a high rate of new microbial growth in the water during transport and storage (IOB/BMZ 2011). This result is confirmed by the aforementioned Ministry of Health investigation from 2013: if we look exclusively at the water samples which were accepted at the source, only 54 % of these samples were still free from E.coli bacteria after transport. In households, only 24 % of the water samples are of drinking water quality after

the water has been transferred from the storage tank. Against this backdrop, the EPE placed particular emphasis on a critical examination of the intended impacts on health.

Target achievement

Before the five DAC evaluation criteria are analysed in detail, the achievement of the target indicators by the evaluated programmes should be outlined briefly. The target values in relation to water consumption, collection efficiency and the recovery of operational costs have been reached. Although the indicators relating to time saving and the reduction of water losses were not completely fulfilled, significant progress has been made in these areas. The number of additional people to be supplied with drinking water as a result of the programmes was also reached. The two indicators defined at country level relating to the degree of water supply and sanitation; however, fall significantly short of expectations in some respects. Because these indicators are more like DC programme target indicators and the impact of the evaluated FC modules is limited, these shortfalls have no effect on the evaluation of effectiveness.

Indicator	Status PA	Target value	Status completion report	Status EPE
(1) National level of supply				
- rural water supply	46.5 %	67 %	55 %	65.6 %
- urban water supply	53 %	75 %	57 %	68 % not fulfilled in urban areas, almost fulfilled in rural areas
(2) National level of basic sanitation				not fulfilled
- rural	17 %	46 %	20 %	
- urban	34 %	73 %	39 %	
(3) Number of supplied people in the programme area (new)	107,500			220,000 fulfilled
(4) Time taken for water collection	3.5h/day	1h/day	1.5h/day	
(time saving)	(0)	(2.5)	(2.0)	(approx. 2h/day) largely fulfilled
(5) Recovery of operational costs				
- rural	64 %	100 %	-	generally >100 %
- urban	78 %	100 %	84 %	103 % fulfilled

(6) Collection rate (urban)	85 %	88 %	80 %	97 % fulfilled
(7) Water losses (urban)	40 %	15 %	No info	20 - 30 % not fulfilled, but still acceptable
(8) Water consumption in l/cd*				
- rural	3l/cd.	20	No info	12 - 35
- urban	4 - 24	20	No info	30 - 45 fulfilled

* l/cd: litres per capita per day

Relevance

As mentioned in the introduction, supplying the population with safe drinking water and access to basic sanitation were core problems in Benin at the programme appraisal (PA). Even today significant constraints in these areas remain. Accordingly, the water sector continues to be a political priority for both the government and international donors. With this in mind, the measures are in line with the developmental objectives of the partner country. The partners and donors have organised their cooperation to date within the framework of a sector coordination group. Considering the health risk which accompanies an inadequate supply of clean drinking water, the measures are aimed at a relevant core problem for the target group. The importance of additional hygiene awareness measures for the population to achieve the intended impacts on health was underestimated at the programme planning, however. The use of adapted transport and storage containers can have a positive effect on the health impacts of improved water sources (IOB/BMZ 2011). This aspect was not given sufficient consideration either at the programme design though. Given the knowledge we have today, the design of the measures was therefore only suitable to a limited extent in order to fully achieve the overall effects intended.

Relevance rating: 3 (for all three parts of the first phase of the water programme)

Effectiveness

Within the framework of Phases 1a - c of the water programme, 13 central supply systems with around 260 taps, 150 foot pumps and 72 latrines were financed in health centres and schools in rural areas. The rural component of the programme focused on the northern departments of Atakora and Donga. The urban programme components comprised replacement, expansion and modernisation investment for water supply systems in eight selected secondary towns - in particular the rehabilitation and construction of 27 new drilled wells, the installation of three water storage tanks, the rehabilitation of 180 km of pipeline and the financing of around 4,000 household connections. The programme site visits, which included a reliably selected sample of rural drilled wells (8), rural central systems (4) and drinking water supply systems with taps in urban areas (5), as well as 4 latrines, showed that the majority of the systems visited were functional and in operation.

The direct objectives of Phases 1a - c were (a) the needs-based improvement of the safe drinking water supply for rural populations and the inhabitants of medium-sized towns and (b) the improvement of sanitation and its appropriate use.

National level of drinking water supply: The ambitious water supply target values defined during implementation of 67 % in rural areas and 75 % in urban areas were not met. At the time of the EPE, the level of supply was 65.6 % in rural areas and 68 % in urban areas. This effect cannot be attributed to the eval-

uated measures, however, and is in fact a result of the implementation of subsequent drinking water programmes by international development cooperation and other donors.

National level of basic sanitation: Overall, the target values for access to basic sanitation were not achieved (cf. reporting 2011; 39 % and 20 % actual access (urban/rural) compared with 73 % and 46 % target values).

Number of people being supplied with clean water: SONEB reports that the financed facilities will ensure supply to around 39,000 additional inhabitants in urban areas. This corresponds to almost 16 % of the population in the urban intervention area. In rural areas, the number of people supplied by means of the financed facilities can be estimated at around 180,000. This corresponds to around 20 % of the population in the departments of Atakora and Donga.

Per capita water consumption: to clarify the question of whether drinking water is supplied on a demand-related basis, we must take into consideration the population's actual water consumption. As part of the EPE, sufficient consumption (30 - 45l/cd) was confirmed in urban areas. Those surveyed were predominantly users who obtained their water from taps. The figures for consumption in rural areas identified by the survey were also sufficient, at 12 - 35l/cd. The user survey showed that during the rainy season, some of the demand is covered by rainwater. Investigation results showed that the freshly collected rainwater is of a good quality, which is why nothing can be said against its use in households for service water purposes (IOB/BMZ 2011). As the user survey was carried out in the rainy season, the figures for consumption in the dry season are likely to exceed the given values.

Effectiveness rating: 3 (for all three parts of the first phase of the water programme)

Efficiency

The quality, costs and timeframes of the construction measures in urban and rural areas generally corresponded to the planning and fell within local parameters. We consider the specific investment costs estimated in the completion report and calculated for the supply of wells (approximately EUR 20 per inhabitant) and for centralised systems (approximately EUR 40 per inhabitant) to be reasonable. The evaluation mission is not aware of a significantly more affordable alternative solution.

While the capacity utilisation of the centralised distribution systems in rural areas is not recorded systematically, SONEB calculates a capacity utilisation of 84% for the eight urban systems financed. This value lies just above the corresponding guideline value of 80%, and thus indicates a reasonable utilisation of capacity.

At the PA, the aim was to reduce pipeline losses in the programme locations from around 40 % to 15 %. In the three secondary towns visited by the evaluation mission, these values were between 20 % (in Dassa and Tanguieta) and 30 % (in Azové). These rates require continuous monitoring by the programme executing agency. In Azové in particular, however, they are still within an acceptable range.

According to SONEB figures, collection efficiency had improved significantly at the time of the EPE, reaching 97 %. This is attributable to the introduction of a modern computer-based settlement system, the rigorous recovery of outstanding debts, and even the suspension of the water supply in the case of continued failure to pay.

Production efficiency, bearing in mind the reasonable investment costs, corresponds to a sufficient level of capacity utilisation, and the monitored water losses are as expected. Despite good collection efficiency, the efficiency of allocation should be viewed more critically, as the effects of the programme have only been achieved to a limited extent (see following section).

Efficiency rating: 3 (for all three parts of the first phase of the water programme)

Impact

The project was intended to reduce waterborne diseases, save time in collecting water, facilitate more gainful employment and raise school attendance rates, with a view to ultimately making a contribution to reducing poverty. Both intended impact levels (health impact and time saving) were evaluated within the framework of the user survey.

Health impacts: The findings of the user survey in relation to the health impacts of improved access to drinking water were clearly positive in both urban and rural areas. However, various studies (IOB/BMZ 2011; DNSP 2013) show renewed contamination of the water with E. coli bacteria in households, caused by improper transport and storage. Undisputed, however, is the fact that water taken from improved water sources is no longer a source of infection for worm diseases. The programme has thus, for example, contributed to the fact that the guinea worm, which was eradicated in 2004, is no longer found in the country. [1] [2].

Time saving: While the aim was to reduce the time needed to collect water from 3.5 hours to 1 hour, the actual time saving realised was around 2 hours. Although the indicator was largely fulfilled, it varies considerably between rural and urban areas. While the inhabitants of the secondary towns surveyed often had an alternative water source (traditional well, neighbour with household connection, pool of brackish water) relatively nearby even before the implementation of the project, and time savings were thus quite low, many inhabitants of rural areas reported a time saving of two to three hours per day. According to those surveyed, this spare time is now used for field work, micro businesses and housework, or even as rest time. Overall, no significant correlation was found between the time savings and professional activity. It is also unclear whether or not the children surveyed attend school more regularly as a result of the measures. In this context, the evaluation from 2011 found that there was a positive effect on the school enrolment rate of girls in at least one of the departments included in the study. The study also indicated that realised time savings likely led to an improved school attendance rate.

In summary, it can be said that the health impacts are limited (in relation to worm infections, however, the impact is significant) and that time savings were indeed realised in rural areas, albeit without it being possible to determine their actual use.

Impact rating: 3 (for all three parts of the first phase of the water programme)

Sustainability

The quality of operation and maintenance as well as an examination of cost recovery are important in order to evaluate the sustainability of the project.

Operation: At the time of the EPE, most facilities had been in use for around 5 years. When it comes to evaluating the operation and maintenance, it is necessary to differentiate between rural and urban areas.

The operation of the systems in rural areas falls under the responsibility of the communes,[3] which appoint a leaseholder for each well and distribution system in accordance with the applicable rules. The leaseholder pays the monthly rent to the commune, which in return takes care of larger repair works. The price for which the leaseholder sells the water to households is set out in the lease agreement and allows the leaseholder a moderate profit. There are, however, many exceptions to this official operating model. In the department of Atakora, for example, half of all drilled wells are operated autonomously by village user committees. These kinds of operating arrangements in particular make sustainable financial management difficult, as support of the user groups was abolished as part of the decentralisation process and no longer sufficiently covers the natural turnover of people on the committees. Individual leaseholders also operate inefficiently at times, however, and have to give up operation. The communes – who own the drinking water infrastructure and are responsible for its sustainable operation – often do not attend to their duties, or do so only very slowly. As a result of the normal wear and tear of the systems, more intensive maintenance works will be required in the next few years, and this also falls under the financial responsibility of the communes. The communes' shortcomings when it comes to securing the operation of multiple water points presents a risk for the sustainability of water supply in rural areas. Further development of communes and the continuation of the decentralisation process will have a decisive impact on the sustainability of drinking water systems.

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[1] Water pumped up from depth is not contaminated with the small crustaceans which carry guinea worm larvae.

[2] The Carter Center: http://www.cartercenter.org/countries/benin-health.html

[3] Benin is divided into 12 departments. Each department is then subdivided into various communes.

In urban areas, drinking water distribution systems are in principle operated and maintained by SONEB. Previous experience with this relatively well-organised company has demonstrated that operations run well in urban areas. Unfortunately, SONEB has problems with serious water shortages in certain departments (in Dassa, for example), while other regions have such large groundwater reservoirs that private suppliers compete successfully with SONEB. As a result of this, isolated risks arise for the sustainability of water supply in some secondary towns. At SONEB taps, as in rural areas, water is purchased from a leaseholder who pays a set price to SONEB per cubic metre. However, unlike the communal systems operated by DG Eau in rural areas, SONEB has no influence on the prices that the leaseholders charge for supplying the end consumers with water. On average, the water from SONEB taps is almost twice as expensive for end customers as that from the rural systems. Even the water tariff for SONEB customers with private house connections – mostly people who make up the wealthier segments of the population – is lower for private consumption than the tariff for taps in urban areas. If we consider the fact that the connection costs required to supply houses with affordable water cannot be covered by poor households, the tariff system is not sufficiently oriented towards the poor.

Cost recovery: In rural areas, the communes are responsible for larger repairs to and the maintenance of the systems. These are financed by the lease income for drilled wells and centralised distribution systems. The communes don't incur any further costs within the context of rural water supply. The operation of drilled wells and centralised distribution systems is generally profitable for the leaseholders. The exception is distribution systems that are situated close to drilled wells which are not part of a lease contract and enable the supply of water at a lower price. Some leaseholders indicate that demand for water declines significantly during the rainy season. On a yearly average though, such operations still appear to be profitable

In urban areas, SONEB operates the distribution system and achieves an average national operational cost recovery of 103 %. It should be noted, however, that only the drinking water distribution systems in Cotonou, Porto-Novo and Parakou generate sufficient surpluses. All other urban systems are in deficit, which is, however, compensated for by the good results in the country’s three larger cities named above. Renewal investment and rehabilitation are predominantly financed from donor resources. This dependency on external financing represents a risk for sustainability.

Sustainability rating: 3 (for all three parts of the first phase of the water programme)

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

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

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

Ratings level 1-3 denote a positive assessment or successful project while ratings level 4-6 denote a negative assessment.

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 is very unlikely to improve. 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. Ratings 1-3 of the overall rating denote a "successful" project while ratings 4-6 denote an "unsuccessful" project. It should be noted that a project can generally be considered developmentally "successful" only if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are rated at least "satisfactory" (rating 3).