

# Ex post evaluation – Benin

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**Sector:** Water supply and sanitation. (CRS code: 1403000)  
**Project:** (A) Water supply and sanitation (PEP), phase II (2008 66 574)\*  
 (B) CP PGF water programme, phase I (2006 65 471)\*  
 (C) CP PGF water programme, phase II (2008 65 642)  
**Implementing agency:** DG Eau and SONEB



## Ex post evaluation report: 2018

All figures in EUR million	Project A		Project B		Project C	
	(Planned)	(Actual)	(Planned)	(Actual)	(Planned)	(Actual)
Investment costs (total)	4.63	4.52	25.4	48.24	6.69	5.89
Counterpart contribution	0.135	0.016	0.60	0.044	0.19	0.15
Financing	4.50	4.50	24.8	48.2	6.50	5.74
of which BMZ budget funds	4.50	4.50	6.50	6.50	6.50	5.74

\*) Random sample 2017

**Summary:** The water supply and sanitation programme (PEP) phase II (project A) was designed as an open programme in six provinces. A total of 14 new central rural water supply systems were built and 1 system was refurbished. The executing agency was Direction Générale de l’Eau (DG Eau). The two phases of the programme-oriented joint financing package for the water programme (projects B and C) financed three baskets: one for building central systems in villages, one for building individual wells, and one for co-financing the investment programme at the second executing agency SONEB in urban areas. Projects B and C are therefore a direct continuation of project A. The central village systems dominated all three projects and were also the focus of institutional developments. During the projects, FC also worked closely with GIZ, who remains active in this area, by advising DG Eau on its strategy for example.

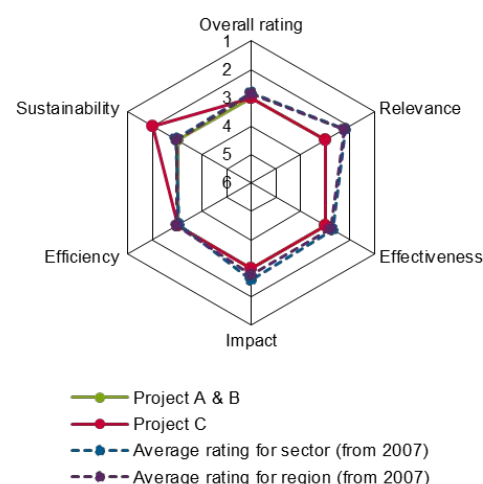
**Development objectives:** The goal of the FC programmes was to establish a sustainable drinking water supply for urban and rural populations (outcome). The improved water supply aimed to improve living conditions for the population and reduce the potential for health hazards from waterborne diseases (impact).

**Target group:** The target group was the population previously without a water supply in various regions of Benin; the rural components focused on the départements of Mono, Couffo, Ouémé, Plateau, Donga and Atacora, while the urban components focused on the city of Cotonou as well as on 17 secondary cities.

## Overall rating: 3 (for all three projects)

**Rationale:** At the time of evaluation (up to eight years after commissioning), most of the financed systems continue to provide the population with a reliable supply of water. Nevertheless, the overall development goals have not been fully met for rural water supplies. This relates to the low water usage rates and the limited scope of positive health effects. Poor usage results in low income and as a result, poor maintenance, which are exacerbated by local authorities' limited capacity to monitor operations. However, the planned restructuring of rural water supplies may help to mitigate the problems affecting the systems.

**Highlights:** Rural water supplies are on the brink of experiencing their second major change in operating structure within ten years. Parts of the initial executing agency structure established with strong technical support from the donors (initially village-based user groups, then private operators tendered at a municipal level, now nationwide tendering with the awarding of partial regional contracts) will then become obsolete for a second time.



## Rating according to DAC criteria

### Overall rating: 3

Ratings (for all evaluated projects A, B and C, unless marked separately):

Relevance	3
Effectiveness	3
Efficiency	3
Impact	3
Sustainability	3 (A and B) 2 (C)

### General conditions and classification of the project (for complex projects only)

The programmes evaluated are several phases of Germany's involvement in the water sector in Benin, a process which has been gradually developed over a number of years. The PEP water programme represents the second phase of a consolidation process involving various previously separate projects for urban and rural water supply using the PADEAR approach ("Programme d'Assistance au Développement du Secteur de l'Alimentation en Eau et de l'Assainissement en Milieu Rural"; the name of this programme phase at local level is "PADEAR VI"). This approach was developed by the Beninese sector administration body in conjunction with the donor community. The two water basket funding packages are an advanced version of this approach, under which the donors' financing was pooled.

As part of project A, 14 central rural water supply systems were established and one system was refurbished. The two phases with the water baskets (projects B and C) financed 65 of these systems (putting all donor financing packages together). In terms of these components, there is no way to distinguish between these two project phases. As part of project B, an additional 53 wells with hand or foot pumps were also financed, along with an expansion of the urban water supply in Cotonou. Under project C, 148 wells with hand or foot pumps were financed as well as extensions to the water supply systems in 17 small and medium-sized towns in Benin.

Initially, only limited investments in the sanitary sector (latrines in schools and other public institutions) were planned as part of the programmes. These measures eventually became part of other associated programmes (particularly PADEAR I–V) and therefore were not implemented here. Consequently, this aspect was not assessed under this evaluation.

The goals and indicators defined in the three programmes correspond with one another in terms of content but were not formulated in a consistent manner. They were also given different values at different times. Furthermore, a higher number of indicators were formulated during the development of the basket funding concept than during the water programme. However, some indicators were removed again for the second phase of the basket funding. Since all three projects are based on the same goals (with the exception of the exclusion of urban areas in water programme II), the goals and indicators are presented consistently for this evaluation. The aim of this approach is to represent the common purpose and consistent methodology applied to the entire FC commitment under review.

Both the urban and rural water sectors in Benin are currently on the brink of a major restructuring process with regard to which sector actors are responsible and who will take over the management of operations. In urban areas, the state-run organization SONEB, which used to be one united body, is supposed to be split into one state-run company that owns the infrastructure and one operating company, which will be offered up for tender to private companies in a second step. In rural areas, the large number of operators is due to be reduced to a few regional companies (six according to current discussions), the tenders for which will be issued by a Présidence-based agency (ANAEP-MR) set up especially for this purpose (this task was previously handled at municipal level). These new companies will be contracted to run, improve and expand existing water supply systems, and also build new systems on a large scale (mostly financed by the World Bank).

## Relevance

At the time of the project appraisals, supplying the population of Benin was one of the core obstacles to the country's development. Specifically, the low number of people with a water supply was cited as a problem. This was caused by a huge neglected need for investment in the water supply in both urban and rural areas. A further problem was the slow implementation of committed donor funds. While alternative local water sources were being used in areas close to the coast, the quality of these sources was poor (bacteria found in open sources). In other areas, these sources contained a high level of salt or iron. In northern regions, the lack of water availability and the long distances to a source of water were the main problems. In terms of cause and effect, the small component of wells with hand or foot pumps follows the same logic as a small distribution grid, the difference being that modern wells can be an adequate solution for lower-population settlements. However, it was revealed that users prefer the added convenience of a motor-powered pump, despite the higher costs. No specific problems were named for urban areas, though the quality of the water can be identified as a source of problems. This situation was also affected by the fast-paced expansion of urban areas in southern Benin. As described in the project appraisal, this sometimes led to overlaps and inefficiency between urban and rural supply areas. Resolving these problems was a top priority for both the government and the donors, who were in increasingly close contact with one another in an effort to find a consistent, common programme with Benin. The aim of this programme was to attract sufficient financing from a larger number of donors on the one hand, and to improve the effectiveness of the responsible local authorities on the other. With regard to the aspect of donor alignment, the programmes were therefore, very relevant at the time of the appraisal. In some cases, this relevance still exists in areas not covered by the programmes.

Nevertheless, the relevance was still reduced to a certain extent because other existing water sources (partly with a poorer water quality) were not closed and, in individual cases were even rebuilt following the construction of FC-financed systems in the direct project environment. This poor planning from the responsible local authorities meant that the current relevance can only be assessed as satisfactory. Apart from this, the underlying chain of effects corresponds to the sector standard and remains comprehensible in the context under review. Investments in the water supply reduce the use of potentially harmful water for drinking/cooking purposes and therefore helps to reduce sickness levels among the population. Measures for reducing recontamination during transport and storage were only carried out in the form of hygiene awareness campaigns (TC). A secondary chain of cause and effect, particularly in northern regions, is the reduction of the supply distance, which has positive effects on women's life in terms of education, workload and income.

**Relevance rating: 3**

## Effectiveness

The programme objective is to establish a sustainable supply of hygienically safe drinking water for urban and rural populations, which should be used in a sufficient extent. The programme's objectives defined during the project appraisal are measured using the following indicators:

Indicator	Status PA, Target value PA	Ex post evaluation
(1) Urban connection rate (connection to grid and urban standpipe coverage)	53% → 66%	87% (2016)
(2) Rural connection rate (individual connections to grid and coverage by water supply points)	46% → 70%	67.5% (2015)
(3) Amount of time needed daily to transport water (rural regions)	3.5 h → 1 h	1 h
(4) Water quality according to na-	No (alternative sources often	Yes (water checked upon

tional standards	pose a health risk)	start-up of operation)
(5) Total amount of unaccounted for water in urban areas	Goal: 30%	28.3% on average (sites visited > 30%)
(6) Minimal rural drinking water coverage	Goal: 20 l/c/d	Not achieved. Fluctuates heavily between 3 l and 9 l.
(7) Full cost coverage in rural regions	69% → 88%	Not achieved.
(8) Full cost coverage in urban regions*	83% → 93%	101%

\* According to information from SONEB

The mission determined that the financed systems were able to achieve a substantial improvement to the water supply in urban and rural areas for the people living in the project area. This improvement was also in line with expectations. Overall, these programmes made a significant contribution to the clear increase in supply rates, even though the increase in rural areas did not quite reach the very high expected growth from 46% to 70%. Despite this, the most important indicator relating to the achievement of objectives was met in the majority of cases.

Nevertheless, the visits to the systems in rural areas also revealed shortcomings in operations management, which slightly detracts from the positive overall result. The local authorities' weakness as the system owners plays a role here. In the course of the decentralisation process (which has taken place gradually over the past 20 years), these authorities were supposed to assume a planning and supervisory role, supported by the devolved services at DG Eau. However, local authorities lack the power to plan and implement rules, which meant that a number of systems not financed under the bilateral development cooperation were built outside of the official planning framework. In some cases, the local authorities were not informed of them at all. Furthermore, local authorities do not monitor operations at all systems to a sufficient extent, and fail to budget in reinvestments, despite the operators paying maintenance and investment reserves. Due to the extensive support from the donors, the FC-financed measures were planned in a sensible manner, and repairs and retrospective improvements are also taking place (see impact related to chlorination). However, the local authorities' weakness when it comes to problem-solving exacerbates some of the aspects described below.

One of the main basic problems is the low water usage rate at all sites visited, which is below half the target indicator of 20 l per person and per day. One significant result of this is the poor cost coverage, though it also causes other problems, which are addressed under Efficiency and Sustainability. Operations management is satisfactory in urban areas and the corresponding indicators have been met. Unlike in rural regions, drinking water is also chlorinated in a consistent manner. In individual cases though, more major problems also occur in urban areas, such as high local levels of unaccounted for water.

### Effectiveness rating: 3

### Efficiency

The programme's efficiency is rated as more or less satisfactory. For both the water programme and the basket funding, the investment costs were slightly below EUR 50 per person. Given the range, the implemented measures were also the most cost-effective technical alternatives for achieving the goals in the context in question.

The implementation of the projects was delayed by around one year. In urban areas, the process from planning to awarding the contracts was delayed. In rural areas, the construction of a large number of supply systems took longer than planned. Due to the complexity (several donors, several regions, several

types of facility, two executing agencies, involvement of local authorities in rural areas) and the partially poor access (rural roads were inaccessible during the rainy season), the time needed for implementation is still assessed as acceptable.

Nonetheless, the generally positive result for efficiency is significantly denigrated by the low capacity utilization. In rural areas, the level of excess capacity is still very high when comparing the goal (demand of 20 l per person per day) and the actual demand (3 l to 9 l), or when considering the low pump usage rates (only every few days during the rainy season, normally just a few hours a day during the dry season). One primary cause for the low demand in rural areas are the costs (full cost coverage is used as the basis for calculating the rates) in the presence of more affordable alternatives (potentially harmful wells and sources are often used, particularly during the rainy season). Private connections increase convenience and reduce the use of alternatives, but they are still relatively rare in rural areas. However, demand is set to increase in the coming years as a result of additional private connections and/or grid expansions planned in a number of locations, though currently implemented on a limited scale only. This increase in demand will improve the utilization rate. These measures will also contribute to make the grids bigger – some are very small (covering a mere 2,000 to 3,000 people in certain cases) – and more efficient as a result. The basic problems afflicting small and underused grids in rural areas were also acknowledged at sector-policy level and are due to be addressed with additional investments.

In urban areas, the FC-financed measures helped to strengthen and expand existing systems, meaning that the capacity utilization rate cannot be clearly defined solely in relation to the measures financed in the programmes. Nevertheless, it can be stated that the utilization rate for the total of five pumps (two new and two refurbished) at the site visited in Comè (including the Grand-Popo site supplied from here) still contains enough reserves for additional grid expansions, which are steadily taking place. While the newly financed pumps are used heavily, the two refurbished pumps are mainly only used in rotation, and the old pump is basically maintained as a fallback option. This means that the most efficient pumps are used and the expected increase in demand will still be able to be covered in the coming years.

Another problem is an excess level of local unaccounted for water, though possible errors in meter readings should also be taken into account. Operations management in this area is always in need of improvement, even at SONEB. The technical losses across all the grids is currently 28.3% and thus within the target expectations, as is the collection rate of 86% (97% for private customers). Overall, both the production efficiency and the allocation efficiency can be evaluated as more or less satisfactory.

In terms of allocation efficiency, the low usage rate should not be regarded too negatively, as the individual users surveyed explained that they do not use other water sources primarily for drinking water but for other water needs (e.g. washing).<sup>1</sup> Nonetheless, the allocation efficiency is reduced by the unsystematic monitoring of water quality by DG Eau, the deficiencies in chlorination and the potential recontamination (see next section).

**Efficiency rating: 3**

## Impact

The aim of these programmes was to improve living conditions for the population and reduce the potential for health hazards from waterborne diseases.

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<sup>1</sup> This use of different water sources of varying quality for different purposes is also an indication of the success of the awareness measures applied under PADEAR.

Indicator	Status PA, Target value PA	Ex post evaluation
(1) The health situation among the population has improved.	N/A	Studies verified a significant improvement to the water quality from the financed systems compared to traditional sources <sup>2</sup> . In spite of this, recontamination as a result of transport and storage significantly reduced this effect <sup>3</sup> . Mortality rates for children under 5 fell from 118.1 (2007) to 97.6 (2016) per 1,000 live births (WB).
(2) The target group has gained time due to easier water procurement and preventing illnesses	N/A	It is much easier to obtain water and most of the supply points in rural areas are now much closer to the settlements.

The good water availability clearly has a positive effect on the project goals. Nonetheless, the low water usage rate in some cases reduces the link between the verified improvement to water quality from the financed systems compared to traditional sources and the improved health data in Benin in general. Yet, in this regard, it is particularly important to consider the irregular monitoring of water quality by DG Eau, the ongoing problems relating to sustainable chlorination despite continued efforts and investments (especially from GIZ), and the risk of recontamination at the water dispensing points. Initially, no chlorination was planned for systems in rural areas. GIZ did not begin systematically installing the corresponding equipment in systems in certain regions until the cooperative programme was continued. For the implementation phase, however, it is important to note that only a part of the systems have the equipment at the moment and that the equipment has already stopped working at some sites. In addition to the risk that the chlorine supplies provided during commissioning are not refilled, the chlorination equipment at some sites has already fallen into disrepair. It is assumed that the low usage rates led to the thin lines getting stuck together. GIZ remains active in this area and is attempting to establish reliable solutions. Studies, however, have confirmed that the systems clearly have positive effects on water quality compared to traditional sources.

The PGF approach used in projects (B) and (C) was a logical development of the PADEAR approach and proved to be beneficial with regard to the sensible pooling of a large number of donor financing packages in project (B) and also with regard to the interruption-free continuation of the components for small rural distribution grids in project (C). However, project (C) was financed only by German FC because the other donors had withdrawn from the sector or – as was the case for the Netherlands – had switched to sector budget financing (within this context, there was a corruption case amounting to around EUR 4 million). To this extent the approach was logical when initiated, though the early investments in its development could no longer be used due to the renunciation of the approach. As a result, its full efficiency could not be harnessed. Overall, the impact-related goals were achieved to a satisfactory extent.

**Impact rating: 3**

<sup>2</sup> Study by the Ministry for Health from 2013: Presence of E-coli bacteria in various water sources. SONEB standpipes: 5.6%; foot-operated pumps in rural areas: 10%; standpipes in rural area: 17%; private open wells: 33%; traditional wells: 100%.

<sup>3</sup> “The risk of vanishing effects” from 2011: Impact evaluation of the rural water supply by the Federal Ministry for Economic Cooperation and Development and IOB (NL). This study determined that the concentration of E-coli in water from modern sources for consumption is close to reaching the level of collected rain water in some cases as the water is not transported or stored properly. The probability of reported diarrhoea-related illnesses was correspondingly high despite the new water supplies, a situation that can be traced back to a lack of hygiene away from the water supply (e.g. latrines).



## Sustainability

The mainly acceptable standard of construction with quantitative reserves plays an important role in making sure the financed systems can be operated in the long term. Nonetheless, there are still some factors that prevent an unqualified positive rating being issued for sustainability, particularly in rural areas.

Sporadic building problems were identified, e.g. pipes were not laid deep enough in some cases or were even left open in others, and some sites experienced high levels of unaccounted for water, seemingly caused by building problems. Despite this fact, the systems are stable on the whole and therefore, the negative effects of administrative and financial problems on rural water grids are still mitigated.

In administrative terms, the local authorities' weaknesses in implementing standards and in their role as the owners of rural systems have a negative impact on sustainability. They have to monitor the results of their operations, set aside the funds provided to them by the system operators so they can carry out the necessary maintenance and rehabilitation measures, and budget for predictable repairs, such as replacing pumps and power generators towards the end of their useful life. This is not being done on a regular basis. Furthermore, poor planning and enforcement of regulations also lessens the sustainability of operations. As a result, alternative water sources are still in use and new water supply points are being built, sometimes even in direct proximity to the financed systems. The alternatives reduce the usage rates of the financed systems and thus decrease their effect and their basis of income.

The low income also restricts the reserves generated by the systems for maintenance and reinvestment. As long as the local authorities continue to put up with alternative water sources with lower retail prices, the increase in consumption will only be limited. The subjective assessment of water prices also does not fare well in comparison with the cheapest tranche of the urban supplier SONEB, which is significantly lower than the retail prices in rural areas (whereby incomes in urban areas tend to be higher than in the countryside). SONEB subsidises consumers of small quantities and standpipe users by charging higher fees to large-scale consumers. No cross-subsidisation takes place between the two areas (rural/urban).

The actors in this sector have taken steps to improve the sustainability of rural systems. On the one hand, grids are being expanded to install more standpipes and generate additional income, which can often be achieved on a technical level without large-scale investments, by using existing capacity reserves. On the other hand, more private connections are being created, which contributes to increased specific consumption (among other things). These measures are due to be stepped up on a systematic basis as part of the planned changes to operations management, which will see a move away from the large number of small operators towards (potentially) just six large operators across the country. This will help to improve efficiency. The new operators should be required to improve existing grids in accordance with certain centrally monitored criteria. Furthermore, this transition is expected to standardize water rates in rural areas, meaning that less profitable systems can be subsidised by systems that are more economically successful in terms of costs for consumers, without undermining the incentive to make sure each system is operating efficiently. The exceptionally ambitious reform and investment programme aims to generalize the water supply in rural areas until 2021. Although this appears almost impossible within the space of four years, but the very high level of political pressure and the investment of several hundred millions of euros announced by the World Bank are expected to lead to a significant improvement to rural water supplies in the next few years. If the programme is completed as planned, then positive effects are expected for the operation of existing FC-financed systems, though the scope and time frame cannot be predicted at this time. Overall the sustainability is assessed as satisfactory for rural areas and good for urban areas. In accordance with the share of financing for the individual projects, the ratings are as follows:

**Sustainability rating: 3 (projects A and B), 2 (project C)**

### 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:

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

Rating levels 1-3 denote a positive assessment or successful project while rating levels 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. Rating levels 1-3 of the overall rating denote a "successful" project while rating levels 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" (level 3).