

# Ex post evaluation – Benin

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**Sector:** Agriculture and land resources (CRS code 31130)  
**Project:** Project: CP-Agriculture Investment Fund Phase I "FI-ProCGRN" (BMZ-Nr 2004 65 484) and Phase II "FI-ProAgri" (BMZ-Nr 2009 67 521)\*  
**Implementing agency:** Ministère de l'agriculture, de l'élevage et de la pêche (MAEP)



## Ex post evaluation report: 2018

in EUR million	Phase I (Planned)	Phase I (Actual)	Phase II (Planned)	Phase II (Actual)
Investment costs (total)	4.00	4.00	3.50	3.50
Counterpart contribution	0.00	0.00	0.50	0.50
Funding	4.00	4.00	3.00	3.00
of which BMZ budget funds	4.00	4.00	3.00	3.00

\*) Random sample 2017

**Summary:** Since the 1990's German Development Cooperation (DC) has supported “Green Sector” development in two Beninese Departments particularly affected by rural poverty: Donga and Atacora. The evaluated Financial Cooperation (FC) programme was part of a broader DC programme covering environmental and natural resource management, agricultural sector policy and agricultural value chains, and harmonisation of sector policies. Phases I and II of the FC programme ran from 2007 until 2014. They included support for the establishment of rural land registers to secure small farmers' tenure, the development of lowlands (small irrigation infrastructure), the construction of warehouses to store agricultural products, and the rehabilitation of rural roads.

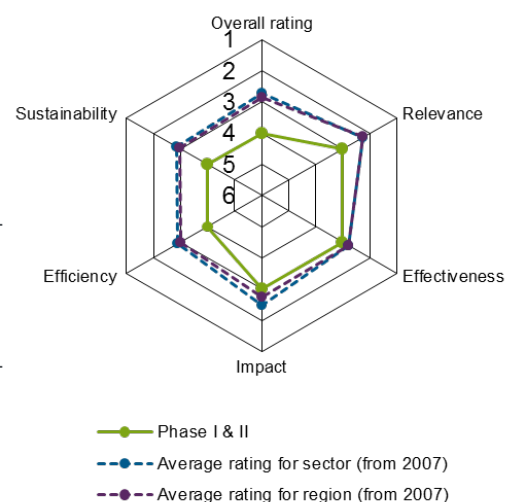
**Objectives:** The overarching goal of the programme was to increase agricultural yields and smallholders' income while fostering a more sustainable use of natural resources at the same time (impacts). The programme was conceived as a complement to conservation measures in the Pendjari National Park, to reduce the human pressure on this protected area and thus contribute to the conservation of biodiversity. The programme measures aimed at clarifying ownership and rights of use to foster investments, support agricultural intensification, facilitate access to markets, secure farmers production and allow them to benefit from better prices (outcomes).

**Target group:** The target group was the rural population of nine selected municipalities in the departments of Atacora and Donga (around 900,000 people or about 130,000 households live in the departments' rural areas). The project proposal emphasized the targeting of the neighbouring population of the Pendjari Biosphere Reserve, but in fact it covered farmers all over the region, most of them living far away from the protected area.

## Overall rating: 4 (applies to phases I and II)

**Rationale:** The measures were relevant to foster smallholders' agricultural development in Northern Benin. But modifications in Beninese legislation severely undermined the programme's cadastre component. At the time of this evaluation it was still an open question how rural land titling could be pushed forward under the current institutional framework. The efficiency of the lowland development and storage infrastructure components is crippled by their limited level of functionality or use. The road component appeared successful and had an obvious (albeit not measured) impact.

**Highlights:** The bottlenecks regarding lowland and warehouses' use and sustainability have been partly addressed in programme phase III, currently ongoing.



## Rating according to DAC criteria

### Overall rating: 4 (applies to phases I and II)

#### Sub-rating (applies to phases I and II):

Relevance	3
Effectiveness	3
Efficiency	4
Impact	3
Sustainability	4

#### General conditions and classification of the project

The FC programme evaluated encompasses two phases funded by the Ministry of Economic Cooperation and Development (BMZ) via KfW: Phase I « FI-ProCGRN » BMZ no. 2004 65 484; and Phase II « FI-ProAgri » BMZ no. 2009 67 521. A substantial part of the second phase supported the completion of measures undertaken in phase I, so the results from both phases cannot be separated from one another. Therefore, both phases must be jointly evaluated. The third phase is ongoing and a fourth phase is currently in preparation. The FC programme is part of a wider DC programme of sustainable natural resource management involving modules of the German Technical Cooperation (GIZ) as well as a further (older) FC module in support of the management of the Pendjari National Park. Unfortunately, the TC activities implemented by GIZ were not operationally coordinated with the FC module or directly complementary at the local level. The evaluation focuses exclusively on activities funded by KfW. These cover a) rural land plans (PFRs<sup>1</sup>) which are a simple form of land register securing tenure of agricultural land, b) development of lowlands (small irrigation infrastructure), c) construction of warehouses to store agricultural products, and d) rehabilitation of rural roads.

#### Relevance

The FC programme under evaluation is part of the DC programme in support of sustainable natural resource management. However, it is not a direct complement to the FC module supporting the Pendjari Park management (BMZ no. 199866922): In contrast to the announcement in the appraisal document it did not particularly target the population living in or adjacent to the park. Neighbourhood farmers actually formed only a minor part of the target group. Therefore, the FC intervention is not really focussed on the preservation of biodiversity. It has to be classified primarily as an agricultural programme designed to alleviate rural poverty. In this respect, the project design is predominantly convincing: It combines interventions on land titling (PFR) as an incentive for private investments with investments into productive infrastructure (lowlands development), storage facilities (warehouses) and accessibility of markets (rural roads). This output combination seems very appropriate to stimulate agricultural production and facilitate the marketing of harvests (outputs). It therefore has the potential to achieve the desired impact of stabilizing and even increasing farmers' agricultural income, as long as some potentially critical bottlenecks for the functioning of this result chain are addressed as well: access to agricultural inputs, farm advisory and marketing support.

Support on these complementary aspects was initially provided by the GIZ. However, the collaboration between the TC and the FC on this programme was terminated in 2011. The FC programme then established links with the local branches of the Ministry of Agriculture (CARDER) that provided these complementary services until the end of programme phase II in June 2014. Since 2016, reforms undertaken in the agricultural sector have led to the liquidation of CARDER. It was officially replaced by two new entities for support (Agence Territoriale de Développement Agricole – ATDA) and control (Direction Départementale de l'Agriculture, de l'Élevage et de la Pêche – DDAEP), but the complementary services mentioned above were still not operational at the time of the evaluation mission. The lack of a long-term plan

<sup>1</sup> PFR: Plans fonciers ruraux = rural land plans.

on how to provide these complementary services has impaired the coherence and relevance of the FC programme.

Most of the lowlands to be developed by the programme were identified and selected during the TC PROCGRN (programme phase prior to the first FC financing), because GIZ supported groups near these sites. Some of these choices were not adequate either for technical reasons or because there were no producer groups existent that were able to promote the programme measures (see details in Effectiveness section).

The warehouse component was integrated into the programme following the 2007-2008 global food crisis, when the Beninese government demanded all ongoing projects/programmes to include creating new agricultural product storage infrastructures. In the evaluated programme, this posed a problem of relevance as there was no necessity for all of the stores built (see details in Effectiveness section).

The implementation of the land use and registering activity (PFRs) has been undertaken in a favourable legislative context. This changed with the Beninese land code adopted in 2013, which undermined the legality of all already implemented PFRs for beneficiaries who had not retrieved their land certificate prior to the law adoption.

From today's perspective we conclude that the relevance of the programme was initially adequate, but subsequently deteriorated due to the various elements discussed above.

**Relevance rating: 3**

### Effectiveness

The outcome objective was to stabilize and increase farmers' income by strengthening the productivity and sustainability of agriculture in the Atacora and Donga region.

Indicator	Ex post evaluation
(1) 126 PFR established and managed by the communes	89 PFR were established, but certificates were retrieved for only 9 % of the delimited plots. Communes stopped issuing certificates and managing PFRs after the adoption of the new land code in 2013. 8 pilot PFRs established in the 1990's were updated. 16 land use plans were established in the Pendjari National Park area.
(2) 16 lowlands are developed and used, with off-season cultures and rice productivity reaching 4.5t /ha.	15 lowlands (347 ha) have been developed, of which 8 (189 ha) are fully functional and exploited, 4 (61 ha) have been abandoned and 3 are very partially exploited (~27 ha exploited on 97 ha developed). Off-season crops remain rare. Yields > 4 t/ha independently confirmed when climate and hydrology are favourable. But technical dysfunctions of the water regulation components (wooden valves) in many lowlands as well as climatic hazards (e.g. very bad season 2017) often cause lower yields.
(3) 12 rural tracks (120 km) rehabilitated and sustainably maintained improve access to villages and production areas, fostering a 25 % increase in traffic.	14 sections (157.4 km) have been rehabilitated. All but one (11 km) are regularly maintained. Traffic has significantly increased, but no before-after measure is yet available.
(4) 11 warehouses increase the decentralised storage capacity of producers.	7 stores were actually built in phase I. 3 are actively managed by producers, 1 is operated by local merchants with a high turn-over. 3 stores are barely used.

The objectives of the programme are captured quite adequately by the chosen indicators that refer to outputs and their use (outcome level). The achieved target values - with the exception of the road component - clearly point to an objective achievement well below expectations, however. The programme's downsides are partly due to the fact that PFR and lowland development were still rather innovative interventions in Benin at the start of the programme. The programme has devoted considerable effort to analysing, taking stock and sharing knowledge about the initial difficulties, sometimes contributing to collective learning by donors and national authorities in this field.

Nevertheless, from today's perspective we have to consider the effectiveness of the programme as unsatisfactory, even if it has achieved some positive results.

**Effectiveness rating: 4**

### Efficiency

The total cost of the PFR component was 2.465 million EUR. That is about 28 thousand EUR per PFR. The PFRs have not been managed by the communes since the adaption of the new law in 2013, so they must all be updated now for their validity to be guaranteed. Without such an update, all the plots delimited during the programme for which no certificates had been retrieved by 2013 (91 % of cases) are not secured. They cannot lawfully be transmitted, split, leased or rented. The required update will be more costly than the original PFR activity in the evaluated programme, because the new law implies a more demanding process: All the village territory must be mapped, all plots belonging to the public domain must be demarcated before any private plot delimitation can take place, and all mapping techniques must ensure a higher level of spatial accuracy than the one applied during the programme.

The overall cost for the lowland development component was 1.066 million EUR, that is an average of about 71 thousand EUR per developed lowland, or roughly 4,900 EUR/ha when related to the 216 ha actively exploited today. If we compare this cost to the additional revenue for farmers (see impact section), it implies that returns equal investment cost no earlier than after 17 years. This indicates a low efficiency, as the national standards consider developed lowlands to be in need of strong renovation after 10 years already.

The total cost of the rural road component was 1.48 million EUR that is an average of about 9,000 EUR/km. As a reference, the cost per kilometre of the main national rural road program (PASTR) varies between about 12,000 EUR/km and 18,000 EUR/km. Hasty comparisons should, however, be avoided, as costs are highly dependent on the works to be carried out, and in particular the necessary crossing works (culverts, bridges). However, the presented comparisons give some indication of efficient spending on rural roads for this programme.

The total cost of the storage warehouses amounts to 0.205 million EUR, i.e. about 29,000 EUR for each of the stores built, bearing in mind that only 4 are frequently used today.

To this amount another 1.784 million EUR in consultancy costs must be added over the 8 years of programme duration, that is 25.5 % of the total amount.

Overall, unit costs per output (production efficiency) are reasonable. But evaluation focuses on allocative efficiency, which means comparing the costs to the use of these outputs and the development results generated by such uses. Efficiency in this perspective is undermined firstly by the limited recognition of the old PFRs under the new legal framework when certificates were not retrieved, and secondly by the partial use of developed lowlands and warehouses. Therefore, efficiency is assessed as unsatisfactory.

**Efficiency rating: 4**

### Impact

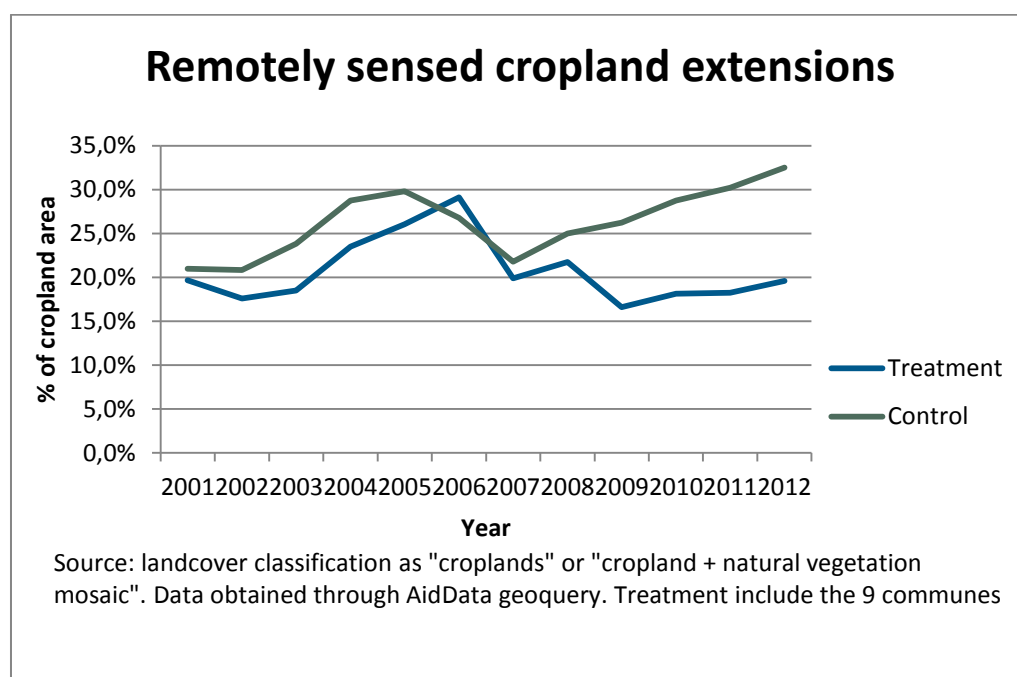
The overall development objective defined during the programme appraisal was that increasing agricultural production and income for surrounding populations should lead to rising benefits of the population due to sustainable usage of natural resources (impact). This impact objective is phrased rather vaguely and is not really distinct from the outcome objective. From the impact indicators that were selected it can be concluded, however, that the reduction of rural poverty (indicator 1) under preservation of natural re-

sources was the impact objective. The latter was to be measured by, e.g. populations of key species and pressure on the Pendjari Park area of controlled occupation<sup>2</sup>. Unfortunately, indicators appear either too vague or not measurable; additionally it does not seem plausible that the program had any influence on the national park's biodiversity, simply because the target group was not limited to neighbourhood farmers (see relevance).

Consultants hired by the programme estimated in 2013 that on a monitored plot lowland development induced an increase of farmers' gross margin of 288 EUR/ha. Further information on the achievement of indicators' target values is provided by other sources:

- A scientific impact assessment carried out on a parallel PFR programme in Benin financed by another donor, but following a very similar approach as the FC programme showed that even in the absence of certification, plot delimitation had a significantly positive short-term impact on farmers' investments. There was an increase of perennial crops and land is more often left fallow to foster soil fertilisation. Further, daily visits on plots are not needed anymore to prevent encroachments; time-savings can be put to a more productive use. Our own analysis confirmed that the socio-economic and agricultural conditions in this programme were rather similar to those of the FC programme. Therefore these findings are likely to be applicable to the FC programme.
- Landsat and MODIS (NASA) satellite data make it possible to measure the annual evolution of agricultural land and productivity since 2000 on a very fine scale. We are using this localized data to assess whether these indicators are changing more or less rapidly in the villages affected by the programme compared to other similar villages, located as well in the northern region of Benin:

We provide below descriptive statistics of croplands extension, comparing the 9 communes targeted by the project with 10 other control communes.



Even if it is not possible to causally attribute this evolution to the FC programme, we do observe different trends between the 9 municipalities targeted by the programme and the 10 other municipalities. Cropland extension increases less in the programme area, which potentially could be the desirable consequence of productivity increases achieved on the programme plots.

To check for productivity increases, we have attempted to use satellite data to assess the larger-scale impact of the FC programme on agricultural production. The hypothesis we tested is that the agricul-

<sup>2</sup> This is a portion of the Pendjari National Park where agriculture has been authorized on the premises that it would remain sustainable and contained

tural productivity index must have increased more in the project beneficiary areas than in other comparable areas. We used the annual average of Normalized Difference Vegetation Index (NDVI) produced from the NASA's Advanced Very High Resolution Radiometer (AVHRR) daily observations as a proxy for agricultural productivity. We calculated the variation between the average indicator value for the programme start year and the two previous years (2005, 2006 and 2007) and the average value for the same indicator for the programme end year and the two following years (2014, 2015, 2016). This indicator is computed at the level of each of the 9 communes affected by the programme. These communes are compared with 12 other communes located in the northern departments of Benin, which are Atacora, Donga, Alibori and Borgou. When the trends in agricultural productivity proxies are compared (using a Student T-test), we observe a small but significant difference in evolutions of NDVIs (T-test of Student t-value of 2.61 p values of 0.018), which suggests that agricultural productivity has increased moderately but significantly more in the communes benefitting from the programme than in the communes not benefitting from the programme. Unfortunately, also the method used here remains too basic to attribute this difference to the programme, in particular in view of the limited effectiveness of the PFR and lowland development measures. More sophisticated approaches could be applied for an extended in-depth study, but this would be exceeding the means available for FC classical ex post evaluations.

The analyses presented above suggest that farmers' investments and agricultural productivity are likely to have increased despite of the almost complete failure of securing land titles. As this is plausibly affecting the beneficiaries' livelihoods in a positive way, the programme impact is assessed as positive, but below initial expectations.

**Impact rating: 3**

### Sustainability

Several effects of the programme deteriorated shortly after its implementation (land reform, non-functional lowlands, warehouse-capacity not exploited by producers). The third phase of the programme that begun in 2016 has already taken corrective measures, e.g. support for the organization of producers in cooperatives, the formalization of management contracts for lowlands and warehouses between producers and communes and the provision of support and advice to producers.

The sustainability of land tenure securitization efforts remains highly uncertain, in the absence of updated PFRs. The new legal and institutional framework is not operational. Pilot projects by other actors than the FC are ongoing in order to gauge the concrete procedures and costs of PFR update under the new legal framework. It seems almost certain that the original measures of the FC programme can at best form a basis for much more elaborate measures to come.

Farmers who use the stores and lowlands that are now operational still have an acute need for complementary services: access to inputs, farm advisory and marketing support. Given the volatility of donor commitment and public action in this area, the only sustainable solution seems to consolidate umbrella structures for agricultural cooperatives, which regularly offer these services to their members and promote their integration into clusters in order to form an institutional structure that can present farmers' interests to the national government and international cooperation. Such cooperative networks are now gaining strength in Atacora and Donga among rice and vegetable producers. They are also efforts to establish information systems enabling donors to identify relevant investments that can be enhanced and maintained.

The system for the maintenance of priority rural roads by municipalities relying on funds supplied by the Fonds d'Appui au Developpement des Communes (FADEC) seems to be working well today, although it still heavily depends on external subsidies. This FADEC is probably the most suitable channel if FC wants to contribute further to the sustainability or even expansion of the road network, enabling small producers to market their crops. A new window of the FADEC is now starting to work for maintenance in the agricultural sector. Experience will show whether this is a suited tool for investments in this area.

When assessing sustainability considering all programme components from today's perspective, sustainability is regarded as unsatisfactory.

**Sustainability rating: 4**

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

Projects 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).