



THEME OF THE YEAR

SOCIO-ECONOMIC IMPACT STUDY OF SEVEN HYDROAGRICULTURAL IMPROVEMENT SCHEMES IN FOUR WAEMU COUNTRIES

BURKINA

MALI

NIGER

SENEGAL



Since the commencement of its operational activities in 1976, the rural sector, particularly the agricultural sector, which is the engine of the economies of the member countries have been priorities for the Bank. The volume of the institution's interventions in this area has been appreciable and has affected rural development in a holistic manner. To date, roughly FCFA400 billion in financing has been granted to the rural sector.

The financing has made it possible to: (i) develop village lands, (ii) develop agricultural, forestry and livestock production, (iii) promote income-generating activities in the rural areas. (iv) organize and train rural workers, (v) disseminate production and land use techniques and technologies.

At a time when in the WAEMU member countries, the issue of resilience of development in the area of food security has become a major problem, the measurement of the impact of BOAD's financing in the rural sector has assumed considerable interest.

With the aim of drawing lessons for the continuation of its action and strengthening its impact, the Bank and some of its partners took the initiative to evaluate a cross-section of seven (7) projects financed between 1982 and 2006 in Burkina Faso, Mali, Niger and Senegal. The projects are the following:

- 1/ **Liptako-Gourma Authority (ALG) phase II** (Burkina Faso) ;
- 2/ **Development of the Kou Valley** (Burkina Faso) ;
- 3/ **Ké-Macina hydroagricultural improvement scheme phase I** (Mali) ;
- 4/ **Yelewani hydroagricultural improvement scheme** (Niger) ;
- 5/ **Anambe Basin hydroagricultural improvement scheme phase I** (Senegal) ;
- 6/ **Kassack North hydroagricultural improvement scheme phase II** (Senegal) ;
- 7/ **Agricultural development in the Matam Department (PRODAM) phase I** (Senegal).

The overall objective of the evaluation was to appreciate the impact of the seven (7) hydroagricultural improvement schemes on the target populations in the four (4) countries mentioned above (Burkina, Mali, Niger, and Senegal) in relation to the initial objectives of the projects. More specifically, the objective was:

- to examine the extent to which the projects financed by the Bank were relevant and generally effective at sectoral level and in relation to national development objectives;
- to evaluate the impact of each of the projects on the lives of the beneficiary populations;
- to make a clear statement concerning the success or failure of the project.

The results expected from this impact study of projects completed 6 to 32 years ago were to make it possible to better understand:

- the impacts of each project on agricultural production and improvement of agriculture, agricultural infrastructure and the improvement of the living conditions of households/beneficiaries;
- the life cycle of each project, from the execution phase up to the date of this study;
- the success and failure factors which might have resulted in the impact noted for each project on its environment, with recommendations to be made into the bargain.

These results should enable each and everyone to draw lessons for the future and for the Bank in particular, to enrich the implementation of its strategic plan which emphasizes the financing of hydroagricultural improvement schemes.

I. SYNOPSIS OF THE PROJECTS EVALUATED

The areas chosen for these schemes are either among the areas most affected by food insecurity (Liptako-Gourma project phase 2, Ke-Macina phase 1, Kassack-North phase 2, PRODAM phase 1,...) or the sites of settlement of populations displaced for various reasons (search for better lands: Yelewani, Kou valley, Anambe; conflicts: PRODAM...).

These projects were executed in countries characterized by an average rural farming population of 70%. Farming activities are carried out by a majority of small-scale producers who are 5 to 10 persons per household (50% of whom form part of the active population), who farm in a very variable manner, depending on the site or country on an average of between 2 and 10 hectares, including 0.1 to 2 hectares which are irrigated (small areas developed at ALG 2 and PRODAM 1; areas as big as 2 hectares per household at Kassack-North 2, Anambe 1).

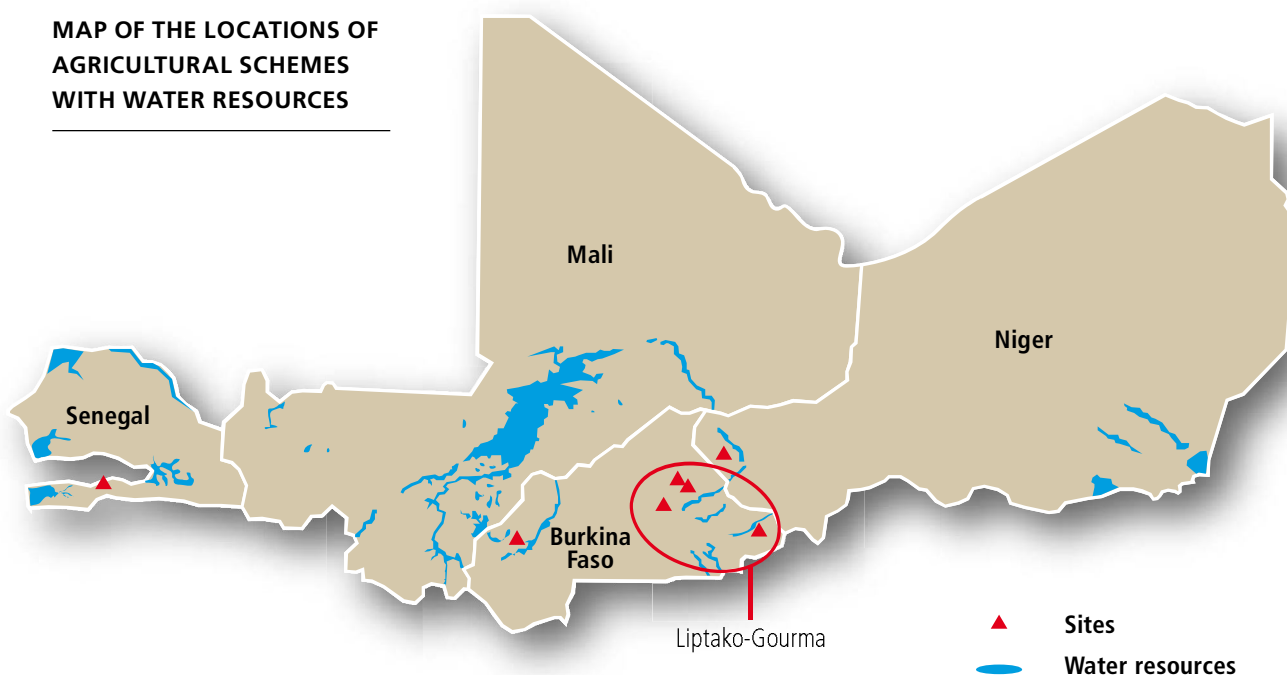
Several types of development, with the harnessing of water were promised, especially after the droughts of the 1970's in order to boost agricultural production and improve agricultural productivity. These are no-

tably: (i) large perimeters, (ii) average-sized perimeters downstream of dams or around natural lakes, (iii) small irrigation projects (at most roughly 20 hectares farmed individually or collectively) or (iv) development of bottomlands with partial harnessing of water.

Generally, cereals are the main crop, whereas the single-cropping of rice two times a year is practised on all the hydroagricultural improvement schemes (additionally, market gardening and maize), with a desired cropping intensity of at least 1.2. The level of rice productivity was very low before the project was initiated (1 to 3.5 tons of paddy rice per hectare), but increased rapidly with the support of the project; even though they vary from one project to the other, these yields oscillate between 4 and 8 tons of paddy per hectare/ farming season.

The decision of the authorities of these four countries to execute these hydroagricultural improvement schemes in order to increase the developed areas and irrigated farming was an excellent initiative for village, regional and national beneficiary communities, but also for the promotion of their activities.

MAP OF THE LOCATIONS OF AGRICULTURAL SCHEMES WITH WATER RESOURCES



II. RECAPITULATION OF THE MAJOR CHARACTERISTICS OF THE PROJECTS

The overall objective of these projects was to contribute to food self-sufficiency and security (particularly in rice and other cereals) and the diversification of production and sources of income, thanks to the improvement of the harnessing of water and the increase in the areas irrigated.

Six (6) major components characterized these seven projects, namely :

- 1/ hydroagricultural improvement schemes (studies, works, control) aimed at the development of irrigable areas and the supply and installation of hydraulic and pumping equipment;
- 2/ the development of livestock (pastures, fattening, artificial insemination, ...);
- 3/ supporting activities which concerned the other types of infrastructure and equipment (stores, access tracks, etc.), nurseries and reforestation, research support, development of fisheries, etc.;
- 4/ agricultural credit and development fund aimed at facilitating the access of beneficiaries to input and equipment loans, as well as the development of income-generating activities in the area of intervention of each project;
- 5/ support for rice and market gardening production and training of beneficiaries;
- 6/ a project management unit (PMU) which covered all expenses relating to the administrative and financial management of the project.

The major beneficiaries of the actions of the project were:

- farmers receiving from 0.10 to 2 developed hectares per household, depending on which project, for the production of rice and cereal crops (millet, sorghum, maize...) and additionally, for market gardening;
- sedentary and/or transhumance-practising livestock raisers whose animals benefitted from crop residues and water from the reservoirs for their feeding and drinking;
- women, through the financing of their economic initiatives;
- village communities, for support measures (tracks, boreholes and water supply, credit, etc.);
- partner services (research, technical support/advisory services of the State, financial and microfinance institutions, private service providers, etc.) thanks to the collaboration agreements for the implementation of the projects' activities.

The overall cost of the seven projects is evaluated at roughly FCFA28.7 billion. This cost was co-financed by BOAD, the recipient countries, the beneficiaries and other donors as follows:

- FCFA12.078 billion from BOAD (or 42%);
- FCFA11.527 billion as contribution from the States, local and regional authorities (CNCAS) and the beneficiaries (40%);
- FCFA17.123 billion by other donors (18%), namely The Netherlands (FCFA368.7 million), Kuwait Fund (FCFA3.839 billion), Crédit Mixte Suisse (FCFA837 million), Saudi Fund (FCFA3.120 billion) and OPEC Fund (FCFA1.639 billion).

III. ASSESSMENT OF THE ACHIEVEMENTS

All planned activities were carried out, but they were not always properly executed and managed in a sustainable manner (ALG phase 2, Kou Valley, Anambe phase 1...). Indeed, the problems identified beforehand are still not solved (flooding and insufficient control of floodwaters, insufficient water in the dry season, production of fodder crops, fattening of draught animals to be culled, utilization of more organic matter with the introduction of animal husbandry...).

The analysis of the projects and their achievements was made from three aspects, namely:

- relevance, the objective of which is to determine if the project executed was in line/conformity with the national and local development context and policies/strategies on the one hand, and with the needs and wishes of the beneficiaries on the other hand;
- effectiveness, the objective of which is to assess the attainment or not of the results expected from the project in comparison with the list of achievements and explanations provided at the end of the execution of the project;
- efficiency, the concern of which is to determine if the resources provided were utilized in a rational manner, with the objective of maximizing results (better cost effectiveness). An assessment is to be made on the optimum utilization or not of the resources budgeted for and injected into the projects.

With regard to relevance, it has turned out that the projects which were evaluated were relevant for two reasons: the food self-sufficiency needs of the countries concerned and coherence with development strategies and policies.

From the viewpoint of effectiveness, the implementation of the projects resulted in an increase in the cultivable area thanks to the developed lands. The level of intensity of farming desired in financing the pro-

jects was not the same everywhere, even if everything was done to ensure that all the developed lands were utilized as much as possible. However, yields actually improved and producers have increased the technical level of their farming practices (fertilizers, weed killers, improved seeds, animal traction, motorized pumps and cultivators, etc.). By and large, farmers do well, even if the productivity of their farms needs to be further improved in order to make them more competitive.

The other externalities of the projects concern the development of animal husbandry by putting in place facilities for livestock and promoting various supporting measures which made it possible to increase and diversify the incomes of beneficiary communities, especially women (village shops, dyeing units, grain mills, shelling/hulling machines, fish farming).

With regard to the efficiency of investments, the actions of the seven projects were on the whole executed in a satisfactory manner, because of compliance with the quantities and the application of funds as expected. Roughly FCFA37.088 billion was injected into the projects, including FCFA11.872 billion from BOAD (32.01%).

The overall rate of execution is roughly 132.86% and 98.04% for the budget provided by BOAD. Additional financing was provided by the states, the beneficiaries and other donors in all the countries and for 5 out of 7 projects (except at Yelewani in Niger and Kassack North in Senegal). The aim was to allow additional investment induced by the shortcomings of prior technical studies, or to carry out additional actions which were indispensable.

IV. IMPACTS OF PROJECTS' ACHIEVEMENTS

To the credit of the execution of the seven projects evaluated, it is important to underscore several impacts associated with the gains of the projects which have a positive effect on agricultural, forestry and livestock production.

As regards hydroagricultural improvement schemes and infrastructure for the opening-up of the areas: in the contexts of food insecurity and poverty which were a bane of the populations in the impact areas of these projects, the undeniable impact is to have made it possible notably to: (i) increase, despite the technical shortcomings noted, the cropped areas on the farms, thus ensuring a more guaranteed production, (ii) disseminate other irrigation systems, and (iii) promote livestock development in areas which were formerly practically abandoned, thus making them viable areas.

With respect to plant and animal production: prior to the improvements brought about by the projects, traditional production techniques were predominant in certain project areas. The development projects made it possible to train all the beneficiaries of serviced plots and enable them to acquire equipment for animal traction, carts, motorized cultivators, etc. The training and equipment, together with support and advice to farmers made it possible, as underscored earlier, to mechanize operations and improve technicity, which resulted in the doubling or even tripling of yields.

The positive effect of the projects is also noted in the achievement of surpluses (50% of the produce gathered in is sold) with the introduction of two crops a year, which was made possible by the development schemes, thus ensuring a higher production and plugging the cereal deficit in households.

The projects also favoured the emergence of other operations in the area, which benefit not only from the irrigation structures, but also from the technical training and supervision offered, in order to improve their productivity.

Thanks to the improvement projects, we have witnessed the sedentarization of pastoralists in the beneficiary communities, due mainly to the improvement of fodder supply and the permanent availability of water. Impacts on the professional and interprofessional organization of the beneficiaries: capacity building for far-

mers in relatively satisfactory proportions had a positive impact on the beneficiaries whose social mobilization and organization have improved significantly and made it possible to have solid bases for sustainable endogenous development.

Impact on the improvement of the living conditions of the beneficiaries: in most cases, the projects contributed towards the establishment of development poles marked by the emergence of a multitude of other activities which create jobs and generate income. As a result, the beneficiary populations have been able to access credit, health services, education, training and modern housing.

Impact on public structures and the private sector: a lack of ownership of the projects by the beneficiaries and public administrations was noted, in the absence of farmer monitoring services following the commissioning of the project.

For all partners of the farmers' organizations, the lesson learnt has sometimes been the feeling of having contributed towards the creation of a new partnership with the rural community.

Impacts on capacity building: the attainment of the objective of capacity-building among the farmers, in relatively satisfying proportions, had a positive impact on the beneficiaries whose social mobilization and organization capabilities and agricultural and livestock production capabilities significantly improved, making it possible to have a favourable basis for a sustainable endogenous development. This holds true especially for all the projects, even if the rate of attainment of the objectives remains variable, depending on projects.

These projects made it possible to slow down migration, to create development poles, in each case, with the development of a multitude of other activities which create employment.

Unanimously, the beneficiaries acknowledge that the projects had positive effects on the educational system of their children. With the improvement of incomes, they are able to pay school fees more easily. Moreover, the projects attracted several investors who opened primary and secondary schools.

Environmental and social impacts: by their nature, these hydroagricultural improvement schemes were all based on the mobilization and utilization of water resources and land, for farming, livestock rearing or farming/forestry/livestock rearing with irrigation, with total or partial harnessing of water. Their impact on the bio-physical and human environment was induced in the short run by the irrigated perimeter development works and in the medium and long term by the systems chosen for their exploitation.

The direct impacts concern the quantity and quality of natural resources, namely water, soils and ecotone or

aquatic biodiversity, but also, the health of the people. It should be pointed out that the real measurement of these impacts is limited, due, on the one hand, to the lack of environmental and social impact assessments (ESIA) prior to implementation and, on the other hand, because several of these projects were completed a very long time ago (sometimes more than 20 years ago); likewise, other projects or actions supported by other donors were undertaken on the same sites or areas of impact since the completion of these projects.

V. SUSTAINABILITY OF THE INVESTMENTS

From the viewpoint of sustainability of investments made, the analyses made show two situations:

- for a first category of projects, capacity building programmes and strategies for the farmers were deployed, which give guarantees for the sustainability of these perimeters. Even though they still require some amount of support in order to strengthen the gains made, the cooperative structures established on these perimeters have attained a viable level of autonomy and functioning;
- for the second category, it should be noted that there are difficulties which are reflected in the insufficiency, or even the lack of maintenance of the hydraulic equipment made available, which is likely to endanger the sustainability of the projects concerned in the medium and long term.

Other difficulties have to do with maintaining the relative quality of the hydraulic structures, guaranteeing ready access to credit for inputs and equipment, purchasing and paying on time for the produce so as to allow farmers to honour their commitments and meet their household expenditure.

Most of the farmers also mention maintenance costs which are increasingly beyond their reach.

However, the projects which received strong institutional support from the State yielded better results in terms of sustainability (better ownership, better maintenance, etc.).

VI. SUCCESS AND FAILURE FACTORS OF THE PROJECTS

SUCCESS FACTORS

The success factors which led to an increase in yields and in production, notably rice production and the raising of small and large ruminants are mainly :

- a better harnessing of water on the developed perimeters, which has significantly reduced flooding;

- servicing of livestock areas by installing the appropriate equipment (boreholes, vaccination areas, health posts...) which made it possible to stabilize the herds and turn these areas into transhumance areas;

- a better mastery of knowledge and more efficient production techniques as a result of training and support from technical outreach services;

- development and utilization of strategies by the producers to reduce the harmful effects of floods. In order to maximize the area developed, the farmers in certain perimeters stagger the sowing dates and wait for the retreat of flood waters before starting to farm;
- confidence-building between producers and financial institutions through the provision of working capital and credit for the purchase of inputs and equipment. This mechanism has made it possible for the producers to have a permanent supply of inputs, or even acquire the equipment necessary for production;
- a strong involvement of women in market gardening and rice processing (parboiling).

FAILURE FACTORS

Apart from the areas rehabilitated/consolidated and the supporting infrastructure in respect of which the objectives have been attained, the results expected from the other actions were only partially attained (cropping intensity, additional production, reforestation, stocking with fingerlings and catches, etc).

Judging from the analyses carried out, the major factors which explain these failures are:

- shortcomings in the technical studies, which did not make it possible to construct hydraulic structures capable of effectively controlling the waters and ensuring the safety of farmers as they go about their production activities (small area farmed, hence low production, insufficiency of water for the development of fisheries, etc);
- inadequate protection of the banks of certain perimeters and intense farming on them, thus facilitating the silting and filling up of the reservoirs with mud and the contamination of waters, which is harmful for fishes, human beings and animals);
- insufficient support for the stakeholders of market gardening, inadequacy of other supporting activities, including the maintenance of the hydraulic works. More favourable contexts would have made it possible to derive more benefits from the developed areas (provision of a larger developed perimeter, application of the recommended farming techniques...), as well as to ensure a rational utilization of water and a reduction of losses.

CONCLUSION / RECOMMENDATIONS

At the end of the analyses, it was noted that despite the difficulties encountered in executing them, the projects attained a number of objectives. They made it possible, inter alia, to reduce food insecurity in the beneficiary villages and increase the incomes of farmers. The projects as a whole, have slowed down migration and have even turned the situation around by becoming poles of attraction. The diet has become more varied and food products are available in greater quantities. Despite the increase in some diseases such as malaria, the provision of drinking water supply points for the farmers has significantly reduced water-borne diseases.

In the area of capacity-building, the farmers also made important gains. Villages have benefitted from infrastructure such as health posts, electricity, rural tracks and, of course, the projects themselves. The impacts went beyond the direct beneficiaries of each project to reach the populations of certain villages located outside the project areas.

The enthusiasm for the irrigated perimeters has reached such a point that the management structures are finding it difficult to satisfy the demand. Several projects have, as it were, become victims of their success. The surveys conducted in the beneficiary households reveal that the living conditions of the farmers on the developed sites differ from those of households in

non-beneficiary villages, even though the latter were affected positively by the projects.

At the macro-economic level, the objective was however not attained, because the projects were expected to reduce significantly the rice imports of the countries. The fall in yields after the completion of the projects, the problems of organizing the farmers and the difficulties of training and supervision by government structures did not make it possible to attain this objective. Moreover, the hopes raised initially by certain projects waned gradually. Likewise, in some cases, the insufficiency of enthusiasm among the womenfolk, together with a certain lack of efficiency of the training and supervision structures did not make it possible to attain the objectives expected for the women.

The projects experienced diverse fortunes and successes associated with the commitment of the national authorities and the beneficiaries on the field, particularly the sustainability or not of the management/training and supervision structures after the completion of these projects. For certain projects which have been completed since two to three decades, most of the equipment or infrastructure put in place have disappeared or are no longer functioning.

Considering the conclusions arrived at, the major recommendations made to BOAD, the States or the beneficiaries, are to:

1/ initiate any discussions and any research/action making it possible to address the issue of the supposed link between reforestation in the irrigated perimeters and the proliferation of grain-eating birds, which adversely affects the design and environmental and socio-economic sustainability of hydroagricultural improvement schemes, in a semi-arid context marked by the precariousness of natural resources, like that of the countries in the Sahel;

2/ monitor the trend of micro-credit lines and partnerships put in place within the framework of projects in order to guarantee better conditions of sustainability for them, including consolidation with new investments. It is recommended to donors to demand, during the appraisal of projects/programmes, that the borrower should define strategies for ensuring the sustainability of project/programme components after the completion of the projects/programmes;

3/ prepare a benchmark situation and monitoring/evaluation indicators prior to the commencement of the investments and project-related activities and evaluating the impact within reasonable deadlines (between 5-6 years after the completion of projects) taking into consideration the activity of the beneficiaries as farmers, but also their memories, in a context where few things are written down;

4/ proceed, in the near future, to rehabilitate the structures while ensuring a sustainable management of water resources and the continuation of efforts to support and provide advisory services to farmers with a view to increasing performance on the perimeters;

5/ improve the knowledge and production capacities of the farmers on the developed perimeters by supporting them to organize efficiently the farming calendar for their operations in order to guarantee an efficient utilization of each component (upland areas, development) and by enhancing their knowledge in applying technical itineraries;

6/ facilitate the installation of the private sector in the River Niger Basin area and ensuring that there is a dynamic inter-branch organization there, with a view to promoting the development of partnerships, capacity-building, private sector financing and shareholding, innovation tests, installation of processing units, etc.;

7/ cater for all the foreseeable environmental and social problems, be they positive or negative, in designing and implementing hydroagricultural improvement schemes;

8/ make use of research findings in order to make gains in productivity by using high-yielding varieties, to have better mastery of production techniques and to make available equipment which is adapted to the mechanization needs of their operations.