

**Burkina Faso**



**Sustainable Water Management  
and Food Security Project**

**(PAMESAD 2014-2017)**

***Public Sector Window Proposal***

***for the***

***Global Agriculture and Food Security Program  
(GAFSP)***

June 2013

## Acronyms and abbreviations

<b>AGETEER</b>	Implementation Agency for Water and Rural Equipment
<b>BF</b>	Burkina Faso
<b>BSECT</b>	Bureau for Monitoring, Evaluation and Work Control
<b>CAADP</b>	Comprehensive Africa Agriculture Development Program
<b>CCASI</b>	Stakeholders Consultation Framework for irrigated-Agriculture sub-sector
<b>CC-PNSR</b>	PNSR Design Coordinating Committee
<b>CEDEAO</b>	Economic Community of West African States
<b>CIC-B</b>	Chamber of Industry and Trade of Burkina Faso
<b>CLE</b>	Local Water Committees
<b>COP-PNSR</b>	PNSR Steering Committee
<b>CPF</b>	Confederation of Burkina Faso Agricultural Producers
<b>CRA</b>	Regional Chamber for Agriculture
<b>CSLP</b>	Poverty Reduction Strategic Framework
<b>CTI-PNSR</b>	PNSR Inter-ministerial Technical Committee
<b>CUA</b>	Africa Union Commission
<b>CVD</b>	Village Development Committees
<b>DADI</b>	Directorate for Hydro-agricultural and Irrigation Development
<b>DGPA</b>	General Directorate of Animal Production
<b>DGPER</b>	General Directorate for the Promotion of Rural Economy
<b>DGPV</b>	General Directorate for Plant Production
<b>DIMA</b>	Directorate for Inputs and Agricultural Machinery
<b>DPV</b>	Directorate of Plant Production
<b>DRAH</b>	Directorate of Water and Land Development
<b>DREDD</b>	Regional Directorate for Environment and Sustainable Development
<b>DRRA</b>	Regional Directorate for Agriculture
<b>DRS</b>	Soil protection and recovery
<b>DVRD</b>	Directorate for Extension and Development Research
<b>ECOWAP</b>	ECOWAS Agricultural Policy
<b>ESIA</b>	Environment and Social Impact Assessment
<b>ESOP</b>	Service and Producer Organization Enterprise
<b>FAO</b>	Food and Agricultural Organization of the United Nations
<b>FEER</b>	Water and Rural Equipment Fund
<b>GAFSP</b>	Global Agriculture and Food Security Program
<b>HIMO</b>	High Intensity Manpower Works
<b>IFAD</b>	International Fund for Agriculture Development
<b>IWRMAP</b>	Integrated Water Resource Management Action Plan
<b>MAH</b>	Ministry of Agriculture and Hydraulics
<b>MAHRH</b>	Ministry of Agriculture, Hydraulics and Fisheries
<b>MCA</b>	Millennium Challenge Account
<b>MDG</b>	Millennium Development Goal
<b>MECV</b>	Minister of Environment and Living Environment
<b>MEDD</b>	Minister of Environment and Sustainable Development

<b>MRA</b>	Minister of Animal Resources
<b>NEPAD</b>	New Partnership for African Development
<b>OMD</b>	Millennium Development Goals
<b>PABSO</b>	Lowland Development in the South-West Region and Sissili Province
<b>PAFASP</b>	Agricultural Diversification and Market Development Project
<b>PAGIRE</b>	Action Plan for Integrated Management of Water Resources
<b>PAMESAD</b>	Support to Water Management and Sustainable Food Security Project
<b>PAPAM</b>	Agriculture Productivity Support Project in Mali
<b>PAPISE</b>	Action Plan and Program of Investment for the Livestock Sector
<b>PAPSA</b>	Agricultural Productivity and Food Security Project
<b>PAU</b>	West African Economic and Monetary Union Agricultural Policy
<b>PDA/ECV</b>	Ten-Year Environment and Living Environment Action Plan
<b>PDDAA</b>	Comprehensive Africa Agriculture Development Program
<b>PDIS</b>	Integrated Development Project of Samandeni
<b>PIB</b>	Gross Domestic Product
<b>PIGEPE</b>	Small-scale Irrigation and Water Management Project
<b>PISA</b>	Investment Program for Agriculture, Hydraulics and Fisheries
<b>PMASA</b>	Global Agriculture and Food Security Program
<b>PNDEL</b>	National Policy for Sustainable Development of Livestock
<b>PNE</b>	National Environment Policy
<b>PNG</b>	National Gender Policy
<b>PNSFMR</b>	National Policy for Secured Rural Land Tenure
<b>PNSR</b>	National Rural Sector Program
<b>PP IV</b>	Promotion of Villages level irrigation Project
<b>PPB/Est</b>	Eastern Burkina Faso Small Dams Project
<b>PRIA</b>	ECOWAS/NEPAD Regional Agriculture Investment Program
<b>PRP</b>	Rainfed Rice Project
<b>PRSP</b>	Poverty Reduction Strategy Paper
<b>PTF</b>	Technical and Financial Partners
<b>RGPH</b>	General Census of Population and Housing
<b>SCADD</b>	Strategy for Accelerated Growth and Sustainable Development
<b>SDR</b>	Rural Development Strategy
<b>SNAT</b>	National Scheme for Land Planning
<b>SNDDAI</b>	National Strategy for Sustainable Development of Irrigated Agriculture
<b>SNSA</b>	National Strategy for Food Security
<b>SP/CPSA</b>	Permanent Secretariat for the Coordination of Agricultural Sectoral Policies
<b>SPAI</b>	Agro-industrial by-products
<b>TRI</b>	Internal Rate of Return
<b>UEMOA</b>	West African Economic and Monetary Union
<b>WAAPP</b>	West Africa Agricultural Productivity Program
<b>WECARD</b>	West and Central Africa Council for Agriculture Research and Development

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## **PROJECT SUMMARY**

**Project goal.** The Sustainable Water Management and Food Security Project (PAMEDAD by its French acronym) will contribute to the country's goal of increasing agricultural production, and ensuring its stability from year to year, through the sustainable development of irrigation. It will address the food and nutritional requirements of an increasing population - especially women and children, and serve the need to mitigate the negative impact of climate change, in the project-targeted areas. The project will complement current irrigation and water management projects which do not have explicit targeting of structurally food deficient areas and/or of vulnerable populations at risk of food shortage. It will support the implementation of the Government's national policy on irrigated agriculture development, which is an integral part of the National Rural Sector Program (PNSR).

**Project Development Objective (PDO).** The PDO is to increase agricultural production and achieve food security among targeted stakeholders in the cereal, horticulture, livestock and fish value chains of the food-deficit areas of the Center-East, Center-South and Sahel regions of Burkina Faso. The Project will improve the performance of the country's irrigated agriculture (including crop, livestock and fish production), taking advantage of the existing irrigation potential in the targeted regions. The project will support hydro-agricultural developments for small irrigation schemes and lowlands. Larger areas under full and partial irrigation and appropriate development packages are expected to result in substantially increased crop, livestock and fish production in structurally food-deficit areas and reduce the vulnerability of populations in those areas.

**Project duration, geographic scope and beneficiaries.** Project implementation is planned over a four-year period (2014-17). It is construed as the first phase of a longer term program to be supported by the World Bank and other development partners. The project targeted areas are the three regions of Center-East, Center-South and Sahel of Burkina Faso that have the following twin characteristics: (i) they are structurally food deficient regions, lagging in terms of nutritional outcomes as compared to the rest of the country; and (ii) they exhibit undeveloped potential for both full-scale irrigation (linked to water bodies) and/or partial irrigation and rainfed conditions (in lowland areas). The development of irrigated lands will directly target approximately 250,000 beneficiary households (of which 75,000 headed by women and 25,000 headed by youth), corresponding to an estimated population of 1.5 million people.

**Project description, cost, economic return and risk.** The project has a total cost of US\$ 41.2 million, of which US\$ 37.1 million submitted for GASFP funding. It consists of three components: (i) *Component 1:* Irrigation and related infrastructure development (US\$ 26.9 million of which US\$24.2 million for GAFSP funding) focused on development of irrigated areas, studies and other upfront activities for lowland areas, storage infrastructure and infrastructure for cattle/sheep fattening and fish production; (ii) *Component 2:* Support to agriculture development regarding irrigated food crop (maize, rice and vegetables), and animal/fish production (US\$ 12.9 million, of which US\$ 11.6 for GAFSP funding); and (iii) *Component 3:* Coordination, management, Monitoring and Evaluation (M&E) and capacity building (US\$ 1.4 million, of which US\$ 1.3 for GAFSP funding). The project economic rate of return is estimated at 29.1%. The overall project implementation risk is assessed as moderate.

## **INTRODUCTION**

1. The proposed Sustainable Water Management and Food Security Project (PAMESAD by its French acronym) seeks funding from the GAFSP's public window to fill part of the financing gap of the country's agricultural investment program. The proposal emphasizes improved access to irrigation water and increased food production (including crop, livestock and fisheries production), with the view to ensuring greater food security. It meets the requirements for GAFSP's funding for which Burkina Faso is eligible.

2. The proposed project is integral part of the National Rural Sector Program (PNSR). The PNSR is aligned with agricultural development policies at regional and international levels. At the regional level, Burkina Faso signed on July 22, 2010, a compact with key partners in which the country committed itself to developing and implementing the PNSR as part of the Comprehensive Africa Agriculture Development Program (CAADP/ECOWAP). At the international level, the PNSR is grounded in the Paris Declaration and will contribute to the attainment of the Millennium Development Goals (MDGs). At the national level, the PNSR is designed to implement CAADP principles, taking into account the country's overall policy orientations and specific orientations from the rural sector. It aims to contribute to the growth and food security objectives of the country's Accelerated Growth and Sustainable Development Strategy (SCADD).

3. All four line ministries in charge of the rural sector, i.e., the Ministry of Agriculture and Food Security (MASA), the Ministry of Animal and Fisheries Resources (MRAH), the Ministry of Water, Hydraulics and Sanitation (MEAHA), and the Ministry of Environment and Sustainable Development (MEDD), will be involved in PAMESAD's implementation.

4. In line with GAFSP country guidelines for the public sector window, this request consists of two parts. The first part summarizes the overall agricultural and food security strategy, and associated rural sector investment plan for Burkina Faso. The second part describes the specific project proposed for GAFSP's financing.

5. It is estimated that about 250,000 households (including 40% of vulnerable groups, i.e., approximately 75,000 women and 25,000 youth) will directly benefit from the project; this corresponds to a population of about 1.5 million people. PAMESAD's activities will be concentrated in three of the country's regions which are structurally food deficient, and where irrigation potential exists. The total project costs amount to CFA francs 20.6 billion of which 18.4 billion (approximately US\$ 37.1 million) are requested from GAFSP and the remainder supported by the State and project beneficiaries. The amount of this request represents approximately 1.3% of the cost of PNSR, and 3.5% of PNSR financing gap (not including pledges).

6. Preliminary economic and financial analyses confirm the soundness of investing in PAMESAD, as it is expected to generate large benefits to for the target population, enhance agricultural GDP growth and reduce the incidence food insecurity. PAMESAD's Internal Rate of Return (IRR) is estimated at 63.7% in financial terms without subsidy and 29.1% in economic

terms. The Net Present Value (NPV) stands at CFAF 12.5 billion at 12% interest. These results are very robust to increases in production costs and reductions in output prices, indicating that the economic risks of the project are relatively low.

7. PAMESAD's macroeconomic impact shows a project's contribution to agricultural GDP growth of 0.6% per year. This result is to be compared with the expected impact of the entire PNSR on agricultural GDP growth which was estimated by the external review at 6.2% year. It testifies to PAMESAD's much larger impact on GDP growth relative to its cost as compared with PNSR as a whole, bearing in mind that PAMEDAD's cost is only 1.5% of the overall PNSR cost. Hence, one franc invested in PAMESAD will generate approximately seven times more growth gain compared to PNSR as a whole. In social terms, the analysis shows that PAMESAD will result in a five percentage point reduction in the proportion of vulnerable households nationwide that currently do not cover their cereal needs of 190 kg/person/year in the 'without project' scenario. Gains are expected to be much higher in the regions targeted by the Project.

## **PART I: SUMMARY OF OVERALL AGRICULTURAL ANSD FOOD SECURITY STRATEGY, AND ASSOCIATED INVESTMENT PLAN**

### **1.1 Country economic background and sector strategic objectives**

8. ***Recent economic developments.*** Burkina Faso's economy is based on the rural sector which employed about 86% of the labor force (National Population Census, 2006) and accounted for an average of 30% of the Gross Domestic Product (GDP) between 2004 and 2010. The rural sector accounts for nearly 61.5% of the monetary income of farming households. Household income structure is dominated by crop production (67%), followed by livestock production (31%). Forestry production only accounts for 2% of rural households incomes (DGPER, 2010)<sup>1</sup>. Burkina Faso has benefitted from a boom in the mining sector since 2009-2010, with gold taking over cotton as the leading export. This has contributed to diversify the country's exports. These exports, however, remain highly concentrated on a limited number of commodities and dependent on global commodity prices.

9. The significant increase in gold exports has been one of the major drivers of growth, which accelerated from 3.2% in 2009 to 7% in 2010 and 9.1% in 2012. Even at 7%, growth remains lower than the 10% growth rate targeted under the country's Accelerated Growth and Sustainable Development Strategy (SCADD, 2011-2015). Under the SCADD scenario, the rural sector is expected to grow by 10.7%, which is challenging given past rural sector growth performance in Burkina Faso. Reaching the SCADD growth targets would allow the country to reduce poverty from the current rate of 44% to less than 35% by 2015, thereby reaching the first Millennium Development Goal (MDG1). At the current growth pace, MDG1 is not attainable by 2015.

10. ***Country agro-pastoral potential.*** Burkina Faso can build on its substantial agro-pastoral potential to achieve a faster and more sustainable rural sector growth. The country is endowed

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<sup>1</sup> From the electronic database of DGPER (*Direction Générale de la Promotion de l'Economie Rurale*), Ministry of Agriculture and Food Security, Burkina Faso.

with 9 million ha of farmland, of which less than half (46%) were under cultivation in 2008. The potential for irrigated land is estimated at 233,500 ha, but only about 12% of this potential is currently utilized. In addition, it is estimated that between 500,000 ha and 620,000 ha of suitable lowlands are available for development of irrigation. There are more than 1,200 water bodies (dams, lakes and ponds) that can collect on a yearly basis up to **five billion cubic meters of surface water**. The country also has a large number of pastoral areas, village level pasture zones, transhumance corridors and various agro-ecological areas suitable for diversified development of the livestock sector, as well as an important potential for biodiversity production and conservation.

11. ***Agriculture constraints and vulnerability.*** Burkina Faso is a Sahelian country and has to contend with serious constraints to mobilize its agro-pastoral potential. It suffers from difficult agro-ecological conditions as a result of its worsening semi-arid climate and increased anthropogenic pressure due to the fast growing population (3.1% per year). About half (46%) of the country's land mass suffers from soil degradation. Rainfall is generally low (from about 300 mm/year in the North to about 1,200 mm/year in the far South-West), irregular and unevenly distributed. The agricultural production, essentially undertaken under rain-fed conditions, is highly vulnerable to external shocks such as climate variability, the effects of which have been more acutely felt in recent years. These effects are expected to be exacerbated with climate change. Agricultural production is also negatively affected by poor access to irrigation water, expensive inputs and equipment, localized land insecurity, and limited knowledge and capacity of producers. In addition, agriculture value chains in Burkina Faso all suffer from weaknesses in output processing and marketing. In this regard, the main constraints include the high cost of energy and equipment, the low connectivity and isolation of production zones with resulting difficult access to market, high input costs and output price volatility. Finally, the limited access to credit is a major constraint. There is a dearth of private financing in agriculture. Private banks and micro-credit institutions are reluctant to finance agriculture activities because of their inherently risky nature. Public financing for the agriculture sector is also insufficient which limits the provision of critical public goods, including rural infrastructure and the accompanying public services which are required to create the enabling environment for private investments in the sector.

12. ***Food insecurity.*** Although Burkina Faso has recorded years of surplus cereals production over the past decade, given all above-described constraints, the country's overall nutrition situation remains of concern in both rural and peri-urban areas, specifically for women and children. The areas most affected by food insecurity cover about twenty provinces which can be considered as structurally deficient in food and income generating opportunities. These provinces are located in four regions (North, Sahel, Centre North and East). About 35% of children suffer from chronic malnutrition, including 15% from acute malnutrition in these regions. The Center-East and South-West regions also have localized areas of vulnerability, and low diversification of income sources. Existing response strategies are insufficient in the face of the vulnerability of these populations at risk.

13. ***Institutional setting.*** The support from the Government and its partners to the rural sector is mainly provided through the four line ministries directly in charge of the sector: (i) Ministry of Agriculture and Food Security (MASA), (ii) Ministry of Livestock and Fish Resources



(MRAH), (iii) Ministry of Water, Hydraulics and Sanitation (MEAHA) and (iv) Ministry of Environment and Sustainable Development (MEDD). These ministries have central directorates with specific mandates. The central directorates are linked to sub-directorates at levels of region (13), provinces (45) and districts (over 300). Rural sector stakeholders are organized in nationwide and commodity-based groups, including farmers' unions and marketing cooperatives. Most of these groups are members of the National Farmers' Association (*Confédération paysanne du Faso* - CPF). The private sector is increasingly called upon to contribute to the development of the agricultural sector, especially through promotion of agribusiness initiatives. The institutional landscape of the agricultural sector is also subject to changes brought about by the new context of decentralization. In this context, the Regional Chambers of Agriculture (CRA) established in each of the 13 regions has been trusted with the mandate to play a greater role in the delivery of extension services to rural sector producers. In addition to the three line ministries, rural sector activities are supported by several other ministries, including the Ministry of Transportation for rural roads, the Ministry of Trade for agricultural marketing, and the Ministry of Research and Innovations for increased access to agricultural innovations.

14. **Legal and regulatory environment.** Burkina Faso's rural sector is governed by several primary legal texts, including the rural land law, the law on pastoralism, the laws on seeds, genetic materials and fertilizers, the code of animal health, environment and forestry, the law on water management, as well as the international protocols and conventions ratified by the country. An orientation policy on agro-sylvo-pastoralism, water and fauna is currently being developed. It emphasizes three principles: (i) the "user payer" principle, above a certain threshold; (ii) the "polluter payer" principle; and (iii) the principle of mandatory authorization or declaration for any hydraulic development. Currently, the first principle is applied only to developed irrigation lands and consists in collecting water user fees to cover maintenance and operation costs of irrigation infrastructure and water supply services.

## 1.2 Rural sector strategy and policy environment

15. **Country strategic policy framework.** The Accelerated Growth and Sustainable Development Strategy (SCADD 2011-2015) provides Burkina Faso's broader rural sector strategic framework. The corresponding policies and programs are specified in the 2003 Rural Development Strategy (SDR) and the 2011 National Rural Sector Program (PNSR)<sup>2</sup>. Because of the importance of water management and food security issues, the country has developed strategies to accelerate the development of irrigated lands (National Strategy for the Development of Sustainable Irrigated Agriculture-SNDDAI), redefine the State's role and rationalize investments in the water sector (Integrated Water Resource Management Plan-PAGIRE, 2003) and strengthen food security (National Food Security Strategy-SNSA, 2003). Specific policies exist for the environment (National Policy on Environment-PNE), land tenure (National Policy on Land Tenure Security in Rural Areas -PNSFMR, 2007) and livestock (National Sustainable Livestock Development Policy-PNDEL).

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<sup>2</sup>PNSR consolidates sub-sector strategies, such as the Agricultural, Hydraulic and Fisheries Sector Investment Program (PISA), the Ten Year Action Plan for Environment and Living Conditions (PDA/ECV) and the Action Plan and Investment Program for Livestock Sector (PAPISE).

16. SCADD focuses on achieving a 10% per year economic growth through increased private investment. For the agricultural sector, SCADD is mainly aimed at: (i) establishing a suitable institutional and regulatory framework to attract investments in irrigation; (ii) adopting agricultural land development and use policies that promote the use of already established and newly developed irrigation, as well as small private and community irrigation schemes; and (iii) promoting domestic value addition in production and marketing.

17. **Rural sector strategic and operational framework.** PNSR is the strategic and operational framework for implementing the SCADD's vision for rural development. PNSR has integrated all relevant strategies, policies and plans for food security and irrigation development into an updated and more coherent approach, based particularly on the strategies and programs developed under: (i) SNSA (food security strategy) which is furthering the MDG1 goal of halving hunger by 2015; (ii) SNDDAI (irrigation strategy) which intends to boost access to irrigation water as a mean to increasing and securing agricultural production; and (iii) PAGIRE (water resources management plan) which deals with water management.

18. **Focus on water management.** Improving water management with a focus on irrigation water is envisaged as a primary way to fight household poverty and food insecurity, and as such constitutes one of the centerpieces of PNSR. Irrigation water will enable the development of crop production. It will also permit the development of livestock and fisheries production. SNDDAI is the strategic framework for water management and irrigation development. It has served to mobilize resources from the World Bank, the African Development Bank, the International Fund for Agricultural Development (IFAD), FAO and several other bilateral partners. To rationalize investments regarding water management, Burkina Faso has been working since 2003 to set up an integrated water resource management plan (PAGIRE). Under this plan, the role of the State in the water sector has been redefined through the creation of appropriate national, basin and local level committees and bodies. These bodies are: (i) The *National Water Board* to ensure a joint management of water at the national level, consisting of the State, the local authorities, the private sector and the civil society; (ii) the *Basin Committee* in the five watersheds targeted at national level; and (iii) the *Local Water Committees* comprising water resource management stakeholders at local level including water users, decentralised local authorities and the civil society.

### 1.3 The National Rural Sector Program (PNSR)

19. **PNSR goals.** PNSR's overall goal is to contribute, in a sustainable way, to food and nutrition security, high economic growth and poverty reduction, with a focus on supporting efficient family farms and agribusinesses. One of the PNSR goals is to improve the country's food and nutrition insecurity status in a sustainable way.

20. PNSR goals, to be achieved by 2015, are as follows:

- a) Ensuring a better coverage of the food needs of the population by increasing the cereal self-sufficiency ratio from 119% to 130%;

- b) Reducing malnutrition rate from 25% to 23% through reducing the share of the population below the minimum caloric intake, and the number of cases of underweight individuals among children under 5 years; and
- c) Ensuring sustainable access of rural and urban populations to drinking water (from 56% to 76% in rural areas, and 75% to 87% in urban areas) and to sanitation (from 10% to 54% in rural areas, and 22% to 57% in urban areas).

21. **PNSR pillars and link with existing strategies, policies and programs.** Table 1 below presents the PNSR pillars and related sub-programs, and establishes the consistency between these pillars and the strategies, policies and programs that represent the building blocks of the Accelerated Growth of Sustainable Development Strategy (SCADD). It also indicates those pillars and related programs that are relevant to the present GAPSP proposal.

22. PNSR consists of the following five pillars: (i) Pillar 1 - 'Improving food security and sovereignty'; (ii) Pillar 2 - 'Increased rural populations income'; (iii) Pillar 3 - 'Sustainable development of natural resources'; (iv) Pillar 4 - 'Improved access to drinking water and living environment'; and (v) Pillar 5 - 'Development of partnerships between rural stakeholders'. The GAFSP proposal focuses on Sub-program 1.4 'Sustainable development of agricultural hydraulics'. This sub-program aims to increase agricultural production through improved management of water resources with the following targets: (i) 17,000 ha of irrigated lands to achieve the 50,000 ha targeted under SNDDAI for 2015; and (ii) 35,000 ha of lowland areas so as to increase the share of irrigated and off-season productions to 50% of annual food production, as per SCADD objectives. The GAFSP proposal will impact the following six sub-programs: (i) Sub-program 1.1: 'Sustainable development of agricultural production'; (ii) Sub-program 1.2 'Improved productivity and competitiveness of animal production'; (iii) Sub-program 2.1: 'Promotion of the agricultural economy and access to markets'; (iv) Sub-program 3.2: 'Sustainable soil and water management, and land tenure security in rural areas'; (v) Sub-program 3.3: 'Security and management of pastoral resources'; and (vi) Sub-program 3.4: 'Improved forest, fauna and fisheries production'. It will also impact Sub-program 5.1 on partnerships for rural sector coordination and management.

**Table 1: PNSR pillars and links to existing sector and cross-cutting strategies, policies and programs**

Sector and subsector	Crosscutting	PNSR pillars (pillars and sub-programs relevant to the GAFSP proposal)
SDR / PISA, PNDEL / PAPISE	SNSA, SNDDAI, PNSFMR / PAPSA	<b>Pillar 1-Improving food security and sovereignty (focus of GAFSP request)</b> (1.1) Sustainable development of agricultural production(ref. GAFSP request) (1.2) Improved productivity and competitiveness of animal productions(ref. GAFSP request); (1.3) Improved animal health and enhanced veterinarian public health; (1.4) Sustainable development of agricultural hydraulics (focus of GAFSP request); (1.5) Prevention and management of Food and Nutrition Crises
SDR / PISA	SNDDAI, PNSFMR / PAPSA and	<b>Pillar 2 - Increased Rural Populations Income</b> (2.1) Promoting agricultural economy or access to markets
SDR, PNE, IWRMAP and PAPISE	PNSFMR / PAPSA	<b>Pillar 3 - Sustainable Development of Natural Resources</b> (3.1) Environmental governance and sustainable development (3.2) Sustainable soil and water management, and land tenure security in rural areas (ref. GAFSP request) (3.3) Security and management of pastoral resources (ref. GAFSP request) (3.4) Improved forest, fauna and fisheries production (ref. GAFSP request)
IWRMAP, PDA/ECV		<b>Pillar 4 - Improved Access to Drinking Water and Living Environment</b> (4.1) Drinking Water and Sanitation (4.2) Environmental Sanitation and Improved Living Environment.
		<b>Pillar 5 - The Development of Partnership between the Stakeholders of the Rural Area</b> (5.1) Steering and Assistance, unifier sub-program dedicated to the coordination and management of the whole rural sector (5.2) Support to Ministry of Environment and Rural Development (5.3) Steering and support for the Ministry of Animal Resources

Acronyms:

IWRMAP:	Integrated Water Resource Management Action Plan
PAPISE:	Livestock Subsector Action Plan and Investment Program
PAPSA:	Agricultural Productivity and Food Security Project
PISA:	Investment Program of the agricultural, hydraulic and fisheries sector
PNE/ECV:	Ten Year Action Plan for Environment and Living Conditions
PNDEL:	National Sustainable Livestock Development Policy
PNE:	National Environment Policy
PNFSR:	National Policy for Land Tenure Security in Rural Area
PNSR:	National Rural Sector Program
SDR:	Rural Development Strategy
SNDDAI:	National Strategy for the Development of Sustainable Irrigated Agriculture
SNSA:	National Food Security Strategy

23. **PNSR investment plan.** PNSR total estimated investment is about CFAF 1,377 billion<sup>3</sup> over the 2011-2015 period. This represents an annual average of 16% of the country's budget. The five most important areas supported under the Program are the sub-programs on (i) 'Improving access to drinking water and living conditions' (Sub-program 4.1, 21% of total budget); (ii) 'Sustainable development of agricultural hydraulics' (Sub-program 1.4, 18%); (iii) 'Sustainable development and natural resources management' (Sub-program 3.3, 11.5%); (iv) 'Sustainable development of agricultural production' (Sub-program 1.1, 12%), and (v) 'Improvement of animal production' (Sub-program 1.2, 8%). The detailed budget per sub-program is appended to this request (Annex 1). All five sub-programs, except Sub-program 4.1 will be supported by the proposed project.

24. **Funding sources and gap.** PNSR funding is provided mainly from the State's own resources and official financial assistance by development partners through a number of projects and programs. The remaining funding is provided by private sources, NGOs, and beneficiaries. Current PNSR financing resources are as follows: (i) own resources from the State and local authorities: 23.7% of total program costs; (ii) external resources already mobilized through projects and programs: 28.4%; and (iii) contributions from other sector stakeholders: 9.5% (private sector, 6%, NGOs, 2.6%, and beneficiaries 0.9%). Taking into account the funding already received from State own resources, development partners and contributions from other partners, the financing gap is estimated to amount to CFAF529.5 billion, representing 38.5% PNSR total cost (Annex 2). Approximately 3.5% of this gap is proposed for GAFSP financing.<sup>4</sup>

#### 1.4 Burkina Faso's record in irrigated area and lowland development

25. **Full-scale irrigation.** The country's record regarding irrigation covers three overlapping development phases: (i) during the *first phase*, in the 70's, the development of sustainable irrigation took place in the western part of the country with a focus on rice irrigation schemes in the Kou valley (1,260 ha), Bazon (460 ha) and Karfiguéla (350 ha), and the sugar cane production perimeters of Banfora (4,000 ha); this phase continued and led in the early 80's to the development of the Great Plains of Sourou and Bagré with a potential of 30,000 ha each; (ii) the *second phase* (80's and especially 90's) concerned a series of small and medium scale areas of 20 to 200 ha that were developed downstream (and/or upstream) of small dams; the first small areas (for example in Boulbi and Louda) were developed in the 70's around the dams; but most small reservoirs were first used primarily as a water points for domestic and pastoral use; and (iii) the *third phase* which focuses on small-scale irrigation began in the early 2000s; it is mainly dominated by the promotion of individual and private initiative and primarily meant for crops other than rice.

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<sup>3</sup> Following the recommendations from the external review process of the PNSR as well as the conclusions of the PNSR Business Meeting held on March 26, 2012, the program cost was revised from CFAF 1,230 billion to CFAF 1,377 billion, mainly to compensate the initial under-investment in livestock production and agricultural research.

<sup>4</sup> With effective mobilization of pledged resources by development partners at the March 2012 PNSR Business Meeting (CFAF250 billion) and through the new G8 Alliance on Food Security and Nutrition (CFAF 54 billion), the financing gap would fall from CFAF529,5 billion to CFAF 225 billion. Against this base, GAFSP request would cover approximately 8% of the financing gap.

26. Despite these efforts, irrigated agriculture in Burkina Faso remains poorly developed. There is a potential 233,500 hectares of irrigable land and 500,000 ha of lowlands. But only 12% of the irrigable area to date is used, and irrigated agriculture accounts for only 0.6% of cultivated land. Private irrigation, in the modern sense, is little developed, despite its introduction in the 70's in some provinces of the country (e.g., Bazèga and Houet). Since the 2008 food crisis, private irrigation has gained greater interest, particularly with the recent emphasis on the development of growth poles in the Sourou valley and around the Bagré Dam.

27. Currently, a number of agricultural and rural development projects are implemented in Burkina Faso with a view specifically to ensuring food security and fighting poverty. Amongst them, several projects contribute to the security of production through the development of irrigation. They provide opportunities for synergies and partnerships for implementing the proposed project. These projects include: (i) *Large and medium scale irrigation schemes*: PAFASP, PDIS, Soum Project and MCA, which promote flow irrigation technologies using open conduits; and (ii) *Small-scale irrigation systems*: PPIV, PIGEPE, PAFASP and PPB/Est which combine open conduits and upstream pumping with semi-Californian system.

28. **Lowland development.** Lowlands have played a significant role in the drought mitigation strategy in Burkina Faso, and interest in their development has been growing since the droughts of the 70's and 80's. Since that time, the lowlands have become the object of considerable attention, and several government projects or NGOs have contributed to develop and secure access to these lands. Lowlands can be easily developed under regular rain conditions above 800mm. Under that threshold lowland development is much more arduous. One study has estimated that the lowlands that can be easily developed in Burkina Faso have an extension of about 620,000 ha nationwide<sup>5</sup>, including about 67,000 ha in the Center-East region and a similar number of ha in the Center-South. In total, therefore, about 135,000 ha would be found in the project area, taking into consideration that none are present in the Sahel region since the rainfall is below 800mm.

29. In Burkina Faso, lowlands are used mainly for (i) winter rice (main crop), (ii) off-season vegetables, and (iii) livestock activities (grazing and livestock watering). They have the potential to play a very important role in achieving food security, and, hence, receive a great deal of attention in the country's agricultural policy. Lowlands can permit to: (i) increase arable land under total or partial water control conditions, hence securing water for cropping activities, and increasing and diversifying production - rice and vegetable crops particularly; and (ii) protect against floods and water runoff that can destroy crops. Lowland developments are generally implemented at low costs due to the use of beneficiary labor, and with strong ownership since there is active participation of the population. The project would not finance the development phase of the lowlands but only the preliminary phase of field work consisting of the detailed identification of lowlands and attendant design of works to be achieved, the socio-economic analysis of work implementation, and the environmental and social impact study. It would also do the sensitization of population to bring them to the required level of ownership and readiness. When possible, it would also support beneficiaries' own efforts and seek partnerships with other

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<sup>5</sup> Dr.BalimA-DamaMyriam 'Development of lowlands in Burkina Faso', presentation made at the Niamey conference on irrigation, Sept. 2012. This total figure for the country's lowland potential stated in that study (620,000 ha) is about 20% over the generally-admitted estimate of 500,000 ha.

projects toward the development of lowland areas that have been studied with the support of PAMESAD.

30. Lowland development is currently supported by a number of projects, the most important being the PRP, PAPSA, PABSO and the EU Food Facility. The technologies developed under these projects range from ripped contour bunds for the more sophisticated (promoted by the PABSO) to simplified bund developments (e.g., PRP type). Most of these projects have also used proven water and soil conservation techniques for the protection and reclamation of soils (CES/DRS) in the Sahel, North, Central Plateau and Center-North regions. These techniques include zaï, half-moon and stone ridges, and have been successfully used to manage rainfall water at plot level.

## **1.5 Rationale for project implementation**

31. Improving water management with a focus on irrigation water is envisaged as a primary way to fight household poverty and food insecurity, and as such constitutes the centerpiece of the proposed project. Irrigation water will enable the development of crop production; it will also permit the development livestock and fisheries productions. The proposed project will contribute to the achievement of the development objectives of National Rural Sector Program (PNSR). It will especially add value in water governance by placing a particular emphasis on effective establishment and strengthening of water management bodies (local water management committees). Furthermore, the project will promote a ‘mini-growth pole’ approach<sup>6</sup> around water reservoirs by providing appropriate support for the development of irrigated agro-pastoral systems with the ultimate goal to increase and secure food production, increase incomes and improve food security. The project will focus on areas that are food-insecure but have potential for irrigation development. The required investigations on potential irrigation sites have already been completed in these areas. In terms of operational approach, the project builds on several decades of experience in the field of irrigation in Burkina Faso, including Bank-funded projects that are still ongoing such as PAPSA and PAFASP. PAPSA would serve as parent project for the proposed project.

## **PART II: SPECIFIC PROPOSAL FOR GFSP FINANCING**

### **2.1 General characteristics**

32. ***Project goal.*** The Sustainable Water Management and Food Security Project (PAMESAD by its French acronym) will contribute to the country’s goal of increasing agricultural production, and ensure its stability from year to year, through the sustainable development of irrigation. The project will improve the food and nutritional security status of vulnerable groups through the support to hydro-agricultural developments for small irrigation schemes and lowlands. Larger areas under irrigation will substantially increase crop, livestock and fish production in structurally food-deficit areas and reduce the vulnerability of populations

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<sup>6</sup> The concept of “mini-growth pole” is used here to refer to concentration of economic activities around the water reservoirs, so as to create opportunities for scale economies in both market access and service delivery (infrastructure, input and equipment supply, advisory services and financial services).

in those areas. By doing so, the Project will complement current irrigation and water management projects which do not have explicit targeting of structurally food deficient areas.

33. The project will support the implementation of the Government's national policy on irrigated agriculture development, as part of the National Rural Sector Program (PNSR). It will contribute to the PNSR objectives of increased producers' incomes and achievement of food security, through the development of agricultural production (including crop, livestock and fish production) predicated on sustainable water resource management. It will contribute primarily to PNSR's Sub-Program 1.4 on the 'Sustainable development of agricultural hydraulics'. The objective of this sub-program is the sustainable management and use of the surface water resources for improved agricultural production and enhanced food security. The Project will also contribute to: (i) Sub-Programs 1.1 and 1.2 of PNSR that support the improvement of food security of vulnerable populations through the development of agriculture, animal and fish production respectively, based *inter alia* on fish stocking of water reservoirs, the production of improved fodder and cattle fattening alongside the water reservoirs; and (ii) to Sub-Programs 3.3 and 3.4 of PNSR concerning the sustainable development of natural resources. In addition, the project will contribute to Sub-Program 2.1 on 'the promotion of the agricultural economy and access to market', and Sub-program 5.1 regarding the establishment of partnerships, as it will promote the Value Chain approach for the target crops.

34. **Project Development Objective (PDO).** The PDO is to increase agricultural production and achieve food security among targeted stakeholders in the cereal, horticulture, livestock and fish value chains of the food-deficit areas of the Center-East, Center-South and Sahel regions of Burkina Faso. The Project will improve the performance of the country's irrigated agriculture (including crop, livestock and fish production), taking advantage of the existing irrigation potential in the targeted regions.

35. **Project duration.** Project implementation is planned over a four-year period (2014-17). It is construed as the first phase of a longer term program to be supported by the World Bank and other development partners. The program will aim at increasing and stabilizing agricultural production through improved water resources management, with the view to mitigating the negative impact of climate change and addressing the food and nutritional requirements of an increasing population - especially women and children - in the project-targeted areas.

36. **Targeted areas.** The project targeted areas are the three regions of Center-East, Centre-South and Sahel of Burkina Faso that are structurally food-deficit areas (see maps in [Annex 6](#)). The three targeted regions have the following twin characteristics: (i) they are structurally food deficient regions, lagging in terms of nutritional outcomes as compared to the rest of the country; and (ii) they exhibit undeveloped potential for full-scale irrigation (linked to water bodies) and/or for partial irrigation or rainfed conditions (in lowland areas). Another criterion for selection of the project regions is they will not have benefitted from significant development of irrigated lands and livestock production support over the past two decades.<sup>7</sup> Finally, project areas targeted for full scale irrigation are those where preliminary studies on irrigated lands have already been completed or are near completion. The focus will be on (i) the expansion of irrigated areas and attendant increase of productive activities, including the diversification of the production into

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<sup>7</sup> One exception is the Bagré Growth Pole Project's interventions in the Center-East region.



vegetable and fish production; and (ii) on the identification lowlands areas and preparation of studies required for their development, with possible partnerships with willing beneficiaries or other projects to accelerate the development of readied lowland areas.

37. **Beneficiaries.** The project beneficiaries are the populations of the Center-East, Center-South and Sahel characterized by high vulnerability as regards their food and nutritional security status. Project investments will be concentrated in areas with high potential for agricultural and economic growth. The concentration of project activities in these areas will create a critical mass, likely to offer opportunities and attract operators and service providers. The project will directly target approximately 250,000 beneficiary households (of which 75,000 headed by women and 25,000 headed by youth); this corresponds to an estimated population of 1.5 million people. It will pave the way for the development of lowlands that will provide opportunity to expand production benefiting additional households in the three regions. This expansion into lowlands is not directly supported by the project since it finances only the detailed identification and studies of their development.<sup>8</sup>

38. **Gender dimension.** PAMESAD will systematically integrate the gender dimension, recognizing that women and youth are a key vulnerable group involved in irrigation and related development activities. Horticulture production, and the development of the fish value chain, linked to the water reservoirs targeted by the project, will serve as flagship activities for gender inclusion. The project will support the implementation of the Land Law to provide the required land security in the developed sites and facilitate their access for women and youth.

39. **Environmental sustainability.** PAMESAD's environmental sustainability stems fundamentally from the project-supported efforts to protect water sources in compliance with the conventions that Burkina Faso has ratified with regard to environmental protection, and to improve the national governance of water resources. In this regard, the project environmental sustainability is predicated on a number of principles that will govern project implementation. These include: (i) characteristics of the project focal areas based on land and water availability with potential for development of irrigated agriculture, and identification of priority value chains; (ii) sustainability of interventions, including mechanisms for the conservation and protection of water, land and other natural resources; (iii) stakeholder ownership of project implementation; and (iv) project administration by the permanent institutions of the State, such as the central and decentralized directorates of line ministries and the local institutions.

40. **Project results and outputs.** The results and outputs expected as part of project activities figure in the Results Framework ([Annex 3](#)). The additional production expected to be generated by the project (not taking into account lowland production) is about 55,000 tons (rice, maize and vegetables). The development of 'mini-growth poles' around the irrigation schemes is the guiding principle of project activities. In that regard, the project will support the development of 2,000 ha of irrigated lands and the construction of 1,600 km of access roads to production zones. It will also support the construction of processing and market infrastructure and provision of support services in the fields of irrigation techniques, animal fattening, community storage, etc., as well as provision of related financial and other services.

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<sup>8</sup> These lowlands are expected to generate approximately 45,000 tons in additional future food production (rice, maize and vegetables).

## 2.2 Project activities

41. Project activities will support PNSR implementation through increased agriculture production, enhanced producer revenues and achievement of food security in the context of sustainable water resources management. As indicated earlier in Table 1, the project will contribute primarily to PNSR Pillar 1 ‘Enhanced food security and sovereignty’, particularly Sub-program 1.4, through the construction and/or rehabilitation of irrigation facilities. The project will include provision of related support services for crop, livestock and aquaculture development, including access to inputs (Sub-program 1.1) and support to community fattening schemes along the successfully experimented model under the Bank-financed PAFASP project (Sub-program 1.2). The project will further support fish stocking and semi-intensive fish production in the water reservoirs created under the project, together with fodder production around these reservoirs, thereby contributing to PNSR Pillar 3 (Sub-program 3.3 ‘Security and management of pastoral resources’ and 3.4 ‘Improvement of forestry, fauna and fish production’) and further capitalizing on water resources management facilities.

42. Project activities fall under three components: (i) irrigation schemes and related infrastructure development; (ii) development of irrigated agriculture; and (iii) capacity building, and project coordination, management and monitoring-evaluation. These components are presented below. The detailed activities, together with the targeting mechanisms (selection criteria, quotas, etc.) will be specified in the Project Implementation Manual. Project activities will be implemented by the Project Management Unit (PMU) of the PAFSA project, in close liaison with the technical directorates of the line ministries involved. At regional and provincial level, the various partners will be associated to project execution, particularly the decentralized units of the line ministries and the Regional Chambers of Agriculture. Selection and approval committees will be set up to vet investment activities.

### ***Component 1: Irrigation and related infrastructure (CFAF 13.4 billion, of which CFAF12.1 billion for GAFSP funding)***

43. The component aims to secure and increase crop production, as well as facilitate access to fishery resources and promote livestock production, through sustainable management of water resources and the development of efficient irrigation and related productive infrastructure. The component also aims to improve water governance by supporting the ongoing capacity building of local water committees (committees of irrigating farmers as well as water users) in accordance with SNDDAI strategies. Operational activities will focus on capacity building of local village communities living alongside water reservoirs and dams in the areas of the project intervention, as well as capacity building for private operators.

44. The component will develop 2,000 ha of land around water reservoirs under full irrigated conditions, of which 70% for community irrigation and 30% for private irrigation. It will also support the identification and preliminary studies of about 13,500 hectares of lowlands to be developed for rainfed or partial irrigation conditions. The lands developed will be primarily used for cereals and horticulture production. Special attention will be given to women and youth in allocating the fully irrigated plots of land, especially as regards horticulture activities. Indeed, experience has shown that these activities, beyond the positive impact they have on women’s

incomes, are a major factor in the improvement of nutrition for the entire household, based on diversification of the sources of food intake, especially for children. The component will also support the construction of approximately 1,600 km of rural roads to facilitate access of livestock to water points, as well as the construction of infrastructure to support fish production and marketing (fish breeding centers, weighing centers, and fish sale points).

45. Beneficiary commitment to reservoir embankment protection will be a major criterion for their inclusion into the project. The irrigated land and facilities upstream of the reservoirs will be located no less than 100 meters beyond the highest water level. In addition, to better protect surface water resources against degradation and siltation, a 20 meter-wide strip of land will be replanted around the bodies of water with appropriate species having deep rooting systems in order to properly secure and protect the soil. This band will be located at least 30 meters above the regular water level. It will create a physical barrier between the water and the cropped land. All activities will be prohibited between the reforested strip and the waterline. Transit corridors for animals to access water will be constructed in specific locations all around the water bodies. The establishment of the reforested band will be the responsibility of the project management structure jointly with the water users. It is expected that the latter, after being sensitized, will understand the merits of the measures to be undertaken and the norms to be adopted. The project will support the acquisition of seeds and/or seedlings for the purpose of land development. The technical services of the Ministry of Environment and Sustainable Development (MEDD) will be called upon to provide support to beneficiaries for the identification of appropriate tree species and the establishment of the reforested strips. These services will also provide support for the implementation of live hedges around the cultivated perimeters designed to protect crops against strong winds and animals and reduce soil degradation.

46. In order to accelerate the land development works, the project will sign delegated implementation agreements with the Agency for Rural Equipment and Implementation of Hydraulic Works (AGETEER) and the Rural Equipment and Water Fund (FEER). These two institutions have a proven track record in the implementation of the project-supported land development schemes. Recourse will also be made to private service providers, as required, particularly regarding the preparation of complementary studies. For private perimeters, the Project will cover the costs of control services to be entrusted to services providers.

47. Land tenure and environmental issues will be given special attention in implementing the selected land development schemes. The mandatory establishment of official records for land cession as part of the application of the law on rural lands will be a prerequisite for any intervention. Similarly, environmental issues will be duly taken into consideration. All land development works will be preceded by the preparation of an Environmental and Social Impact Assessment (ESIA). The project will stimulate off-season job creation through the promotion of labor-intensive works (HIMO), with priority given to women and rural youth in the implementation of such works whenever possible. Investments will be operated and maintained by the water user committees established for that purpose. This will ensure the sustainability of these investments. The synergy and harmonization with other projects working in the same area, especially PAPSA, PAFASP, PIGEPE and PRP, will be sought.

### **Sub-component 1.1: Infrastructure for irrigated/lowland crop production**

48. Project activities under this sub-component relate to the development of land for cropping purposes. This land will be under full (irrigated perimeters) or partial (lowlands) water control irrigation. Storage structures (community or privately managed) will also be constructed to facilitate the storage, processing and marketing of crops.

49. ***Irrigated land development.*** Irrigation works relate to the development of small irrigated areas around existing reservoirs with a minimum storage capacity of 300,000 cubic meters of water, excluding dams for domestic, hydro-electric and pastoral use. The General Directorate of Land Development and Irrigation (DGADI) has already identified 80 existing retaining reservoirs in the project area with total irrigation potential of 35,620 hectares<sup>9</sup> (see [Table 2](#) below). From this potential, 1750 ha of irrigated areas will be developed upstream, and 250 ha downstream of the reservoirs. About 25,500 farming households will directly benefit from these developments (30% headed by women and 10% by youth. The total beneficiary population is estimated at about 230,000 people.

**Table 2- Areas already developed and to be developed in targeted regions**

Region	Number of reservoirs	Area already developed (ha)	Area to be developed (reservoir capacity > 300,000m3)		
			Upstream of reservoir (ha)	Downstream of reservoir (ha)	Total (ha)
Center-East	21	316	616	657	1,272
Center-East (Bagré)	1	3380	9,000	21,000	30,000
Center-South	20	422	401	428	829
Sahel	20	186	2,912	607	3,518
Total, project area	62	4303	12,929	22,691	36,620
<b>Total, country level</b>	<b>1,347</b>	<b>38,000</b>	<b>n.a.</b>	<b>n.a.</b>	<b>33,500</b>

Source: Directorate of Land Development and Irrigation (DADI)

50. The irrigated areas will be developed in ‘clusters’ around water reservoirs following the model of ‘mini-growth poles’. To ensure the sustainable development of these areas, the project will support the establishment and capacity building for irrigation farmers committees at cluster level. These committees will be key constituents of the local water committees (CLE) established at the sub-catchment level (see [Sub-Component 3.1](#) for additional details). Technical support to the irrigation committees will be provided in tandem by both the Regional Chambers of Agriculture and the decentralized technical services. Training, as needed on all fronts (technical, organizational, commercial and economic), will be emphasized.

51. ***Irrigated land schemes.*** The schemes to be developed will be of two types: (i) gravity irrigation downstream of small dams and reservoirs for irrigated rice production; and (ii) semi-Californian irrigation systems upstream of the small dams for cereal production and horticulture. The gravity irrigation systems under (i) will be developed on community land covering between

<sup>9</sup>For most sites at the level of these retaining reservoirs preliminary studies exist. Upon project approval, additional studies will be launched simultaneously with the preparation of the project to allow for a rapid start of development activities.

10 and 20 ha. The development will consist of a head infrastructure linked to a network of canals for water supply and drainage, with small size control facilities and small bunds at plot level. In some cases, a protective dyke may be required along the minor bed of the river. The semi-Californian systems under (ii) will include community perimeters of 20 ha average size as well as private perimeters averaging 5 ha in size. A typical system is equipped with a motor pump, a primary supply channel, a PVC distribution and drainage network and associated works (partitions, water intakes at plot level, etc.). Terminal facilities consist of planting lines or beds depending of the crop selected.

52. **Lowland development.** In addition the project will support the preliminary phase of studies and field work regarding the development of about 20% of the potential 135,000 ha of lowlands or 27,000 ha, in the Center East and Center South regions. This phase will consist in the identification of lowland areas that have potential and can be easily developed, the preliminary design the type of works to be executed, the socio-economic analysis of these areas, and the environmental and social impact study of planned development works. The project will also conduct the sensitization campaign to bring populations to the required level of ownership and readiness.

53. **Participatory implementation arrangements.** In Burkina Faso and many other countries, rural infrastructure has proved to be managed far more efficiently under participatory mechanisms than directly by State companies or technical services. Project implementation arrangements, therefore will allow for oversight and control by beneficiaries. Patterned against the successful PICOFA model, the management of small schemes will be entrusted directly to the decentralized communities and producer groups (Local Water Committees-CLE, Village Development Committees-CVD, other formal rural organizations, etc.) The project will build their capacities in that area. It will provide them with models of documents, pre-specified parametric costs, and, in some cases, lists of services providers meeting the technical, legal and regulatory requirements. For more complex facilities, project management will be entrusted to agencies such as FEER and/or AGETEER on the basis of delegation execution agreements. FEER and AGETEER have a good track record as ‘delegated executing agencies’ on behalf of the State or its agencies, local authorities and associations, and all other public or private organizations, projects or programs, for civil works in rural areas (buildings, hydro-agricultural development, small dams and water reservoirs, wells and boreholes, fingerlings nurseries, etc.). In all cases, the separation of the water catchment and water usage functions will be established as it have proved to strengthen user ownership of rural investments.

54. The project will sensitize beneficiaries to this new approach. Participating producers will be organized in committees, and trained in the operation and maintenance of irrigation infrastructure, market investigation, cooperative management, efficient use of irrigation water and the application of technical packages for irrigated agricultural production. The technical services of the State, in collaboration with producer organizations (CRAs, Irrigation Committees) and CVD support, will work with beneficiaries to ensure that they adhere to their obligations. The payment of agricultural water charges will contribute to the operation and maintenance of irrigation infrastructure. At the same time, the State will continue assuming its support role in the design and implementation of works once the project is completed.

55. **Community warehouses.** The project will finance the construction of 20 community warehouses with a capacity of 500 tons each, equipped with mechanical winnowing, bagging and processing equipment of agricultural production. These facilities will reduce post-harvest losses, reduce the risk arising from the low level and/or volatility of producer prices at harvest time and improved the quality and value addition of the marketed products. For the operation of these warehouses, both male and female producers of irrigated areas will be equally considered, through their organizations, as potential beneficiaries. Other producers of the project area will also benefit from this support. The warehouse will allow an efficient implementation of the storage and warehouse receipt ('warrantage') system. The proposed component will build on the experience of PAPSA in that area. The construction of the required facilities will be entrusted to AGETEER and/or FEER, or other private companies through delegated execution agreements.

### **Sub-component 1.2: Infrastructure for cattle and sheep fattening/finishing**

56. This sub-component will finance the construction of corridors for animal access to water reservoirs, storage structures and fattening facilities, as well as the corresponding studies and workshops to facilitate consultation between stakeholders. More specifically, it is envisaged to develop two access corridors, averaging 10 km in total length per water reservoir, or 1,600 km for the 80 water reservoirs. In addition, the sub-component will finance the construction of community storage facilities for livestock feed and other farm inputs, as well as private cattle fattening facilities around the water points. Specifically, the project will build (i) at least one collective store on each of the 50 water reservoirs targeted by this activity; (ii) 1000 fattening units distributed as follows: 500 fattening units for cattle with a capacity of at least 5 cattle each (2500 cattle) and 500 fattening units for sheep with a capacity of at least 10 animals (5000 sheep). Each fattening unit is expected to undertake three 3-months production cycle per year (total annual expected production is 7,500 cattle and 15,000 sheep). The sites will also be equipped with operating equipment (feeders, watering tanks, cart, straw chopper, etc.). In targeting, priority will be given to women and youth (see selection mechanism for Sub-component 2.2 below).

### **Sub-component 1.3: Infrastructure for fish farming**

57. Fish products play an important role in terms of food and nutritional security of rural populations. Indeed, they provide the local rural markets with high quality animal protein and essential fatty acids, especially for vulnerable groups such as pregnant women, nursing mothers and preschool children, at prices that are generally affordable, even for the poorest sections of the communities.

58. The project will finance consulting services and works for the construction of a fish hatchery station at the Yakouta dam in the Sahel region and for the rehabilitation of the Bazèga fish farm in the Center-South region. It will also fund (i) three specialized stores selling standard fishing equipment corresponding to norms, for a rational and sustainable exploitation of the fish resource, and (ii) twenty-six weighing centers to improve fish marketing. The construction of these facilities will be outsourced to private companies. Contribution will be requested from beneficiaries.

**Component 2: Agriculture development (CFAF 7.9 billion of which CFAF 7.1 billion for GAFSP)**

59. This component will support the optimal and sustainable use of irrigated lands and related productive infrastructure for the development of crop, animal and fish production.

**Sub-component 2.1: Support to crop production (maize, rice and horticulture)**

60. This sub-component supports the rational and sustainable use of improved agriculture practices to capitalize on irrigation and water control facilities.

61. ***Value chain approach.*** This sub-component will be implemented using a value chain (V/C) approach, with focus on the following priority crops: (i) maize and rice, for perimeters located downstream of reservoirs; and (ii) maize, tomatoes and onions for the perimeters located upstream of reservoirs. Implementation of the sub-component will require reinforced synergies between existing projects supporting the targeted value chains (V/Cs) (ex. PAPSA for maize and rice, the Rainfed Rice Project for rice, PAFASP for horticulture, and WAAPP for all three value chains). Activities under this sub-component will focus on the linkages with the V/C between production, storage processing and marketing, following *inter alia* PAFASP's successful experience in the organization of V/C actors. It will also support the establishment of productive alliances between actors in V/C segments to promote the integration of their activities and enhance the value addition generated.

62. ***Improved packages for crop production and water management.*** Producers around the water reservoirs on irrigated lands developed by the project will be given extension advice through the regional DRDH services to improve their husbandry practices, based on the improved methods and practices developed and disseminated as part of the WAAPP-prescribed packages. One approach that will be important for improved water management is the System of Rice Intensification (SRI) supported by CORAF under the regional WAAPP initiative. SRI is an agro-ecological and climate-smart methodology for increasing the productivity of rice and other crops (up to 100%), while reducing the amount of seed, water and chemical fertilizer needed, simply by changing how the plants, soil, water, and nutrients are managed. SRI greatly has been proven to raise farmers' income and enhance household food security. PAMESAD will capitalize on the SRI methods and practices already successfully used in many African countries, including in neighboring Mali as part of the Bank-financed PAPAM and USAID-financed IIECM projects.

63. ***Improved seed production.*** The project will also support the promotion of successful innovative technologies for primary seed production, as well as seed processing and storage, being developed and/or tested by the WAAPP project. The sub-component will build on the experiences of current projects such as PAPSA for access to quality inputs. Concerning vegetable/horticultural seeds, the project will work with the WAAPP project, in close liaison with PAFASP. WAAPP focuses on the development of improved vegetable seeds by fostering partnerships between the research community, the private sector and the producers.

64. ***Post-harvest technologies.*** Concerning post-harvest management, the project will build on the successful experiences of programs such as the Rainfed Rice Project (PRP) to equip rice

farmers downstream of dams with motorized threshers (capacity between 12 and 15 tons). It will also capitalize on the implementation of projects in the sub-region based on the productive alliance model, particularly the ESOP<sup>10</sup> model successfully implemented in Benin and Togo. Improving post-harvest operations will reduce the producer labor and provide rice of improved nutritional quality. Taking into consideration the perishable nature of horticultural products, the project will also support the conservation and processing of onions and tomatoes. This will involve equipping women's groups with solar drying units. The acquisition and installation of these units will be fully subsidized by the project. In the case of onions, producers organized as part of 'producer irrigation committees' will be supported with the supply of storage silos, using a partial subsidy scheme via matching grants as currently practiced by PAFASP.

65. **Product marketing and warrantage.** Regarding product marketing, the project will support the development of warrantage (see Box 1 below), *inter alia* by strengthening the capacity of stakeholders in storage/conservation management, contracting and marketing in the three targeted geographic areas. The key activities to be funded are: (i) sensitizing and training farmers on best practices for conservation and storage to minimize losses due to poor storage conditions; (ii) training farmers on collective marketing of cereals, and (iii) connecting producers with financial institutions and potential buyers (using market information, dissemination of price information, organization of consultations and meetings, etc.) Based on observed cases such as the area run by the Union of groups of agricultural marketing (UGCPA) in the Mouhoun area, the expected impact of warrantage is first price stabilization, i.e., the reduction of the price difference observed between harvest time and the lean time which is currently about 20%. The other expected impact is an increase in the annual average price of 10% to the producer.

**Box 1: Warrantage**

The warehouse receipt or 'warrantage' system is a mechanism for improving the marketing of agricultural products through a system of proper storage that can be used as collateral to secure a loan or used to be subsequently sold or self-consumed. This practice can be done through warehouses at individual or group level. The warehouse receipt system allows farmers to borrow money without having to sell off their produce when prices are the lowest, conduct other income generating activities but also take advantage of price increases at the time of lean period and/or dispose of their production for their own consumption after repayment of the loan.

66. **Capacity building.** In addition to supporting production and post-harvest activities for cereal and vegetable value chains, the project will build on the following achievements of PAPSA and PAFASP projects: (i) supporting producer organization through the creation of irrigation farmer committees and building farmers' technical and organizational capacity through training on various themes; and (ii) providing support to key stakeholders (e.g., business oriented farmers) by strengthening the services from public and private providers and empowering the Regional Chambers of Agriculture of the targeted regions in the control of the quality of these services.

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<sup>10</sup> ESOP is a form of productive alliance between producers' groups and an enterprise (private or public/NGO) that ensures delivery of inputs, advisory, processing, financial and marketing services to producers for a greater efficiency and shared profitability in value chain development.



67. ***Input subsidies and other incentives.*** Project support to grain production will be based on the system put in place by the Government of Burkina Faso, including a subsidy up to 50% to improve the access of farmers to quality inputs for the maintenance of soil fertility and the increase crop yields of irrigated perimeters. This subsidy will be made available equally to all the operators (men and women) of the project-supported irrigated perimeters. The project will also support the production and use of organic fertilizer through existing methods of composting being extended by PAPSA. It is expected that by project end, participating producers will have acknowledge the value of improved inputs (especially fertilizers and improved seeds), and, through increased productivity and income, will have mobilized sufficient own resources to purchase these inputs even at non-subsidized prices. To preserve the common practice among market gardeners who traditionally purchased fertilizers at cost, the project will not finance fertilizer subsidies for this group of producers.

68. ***Selection of beneficiaries.*** The selection of beneficiaries will be based on the procedures described in Decree No. 2012-705-PRES/PM/MAH/MEF/MATDS/MEDD/MRA of September 6, 2012 regarding ‘the general prescriptions for land occupation related to the use of family type irrigation schemes’). In a nutshell, the decree provides for the establishment of an ad hoc committee composed of local authorities, administrative, customary, civil society, decentralized technical services authorized, producer organizations, and women's organizations. This decree also specifies that gender should be taken into account in the allocation of plots, by setting quota in favor of women, youth and other disadvantaged groups.

### **Sub-component 2.2: Support for cattle and sheep fattening/finishing**

69. ***Objective and targets.*** The objective of this sub-component is to improve farmers' incomes (youth, women and other animal producers) through the promotion of fattening techniques and better access to animal feed and care. The financial analysis shows that the fattening activities are highly profitable (see [para 93](#) on financial and economic analysis) Specifically, the subcomponent will: (i) promote the creation of fattening groups on at least 50 sites in the three target regions (Center-South, Center-East and Sahel); (ii) build the capacities of members of these groups to improve their fattening system; and (iii) develop fodder crops. A total of 2,500 cattle and 5,000 sheep will be fattened per cycle (typically 3 cycles a year), as part of fattening units for each of the fifty (50) water reservoirs constructed under the project.

70. ***Intervention strategy and activities.*** The intervention strategy involves the identification and selection of targeted producers around water reservoirs and dams, the creation of producers' groups ('clusters') and the training of beneficiaries. The cluster is a cattle and sheep fattening group, the concept of which has been developed and successfully implemented under PAFASP. It is an informal organization of small producers (with 5 heads of cattle and 10 head of sheep each on average) residents of the same village. It is managed by a management committee composed of the members of the village. In implementing fattening activities, members procure inputs jointly and sale animal collectively. Fodder production will be supported through provision of inputs and equipment. Technical support and advisory services will also be provided. Given the successful experience of PAFASP in promoting cattle fattening activities, a strong synergy will be built between PAMESAD and PAFASP regarding the implementation of this sub-component. The project will facilitate access by beneficiaries to technical, commercial, economic and legal advice by the funding of an adequate support mechanism. For this purpose, a

roster of eligible service providers in the project area will be jointly established with stakeholders and made available to their organizations and to the Regional Chambers of Agriculture.

71. ***Beneficiary eligibility criteria.*** There will be two main eligibility criteria for access to project financing for this sub-component. First, the initiative, as described above, must be based on producers' clusters. Second, initiatives consisting of at least 30% of women and 10% of youth organizations will be given preferential treatment. They will be eligible for funding up to 70% of the cost of their sub-project. The other initiatives that cannot meet this criterion will only be eligible for funding of 50% of the cost of their sub-projects.

72. ***Participatory process.*** The process will be demand-driven. The applications submitted by interested organizations will need to go through three levels of screening: (i) first level screening: the associations shall first submit a brief concept note describing their initiative, including basic information about their association and its membership; the objective of this first screening is to establish whether or not the initiative meets the criteria for project eligibility; all organizations with eligible initiatives will be invited to submit full proposals; (ii) second-level screening: all eligible proposals will be forwarded to the Project Approval Committee (PAC) where they will be evaluated by a competent external team based on clear and transparent criteria related to technical, economic and environmental aspects; the assessment will result in a ranking of the proposals based on a precise scoring process; only proposals exceeding a predefined threshold rating will be cleared to go ahead; and (iii) third level screening: the project board of directors composed of the statutory members of the steering committee will proceed with the final selection of proposals; this selection will take into account the available budget and the alignment with development objectives in the targeted regions.

### **Sub-component 2.3: Support for fish production**

73. This sub-component will include the following activities:

- a) ***Promotion of sustainable management of fishery resources:*** This activity aims to increase the use of inputs and equipment that comply with fishing norms and standards. To this end, the project will facilitate the acquisition of such inputs by fishermen and their access to weighing equipment to improve fish marketing;
- b) ***Support to fish production:*** This activity will consist in funding the stocking of 30 reservoirs (10 per zone of intervention) and adoption of fish production techniques in cages on 15 water bodies (5 by project region). The project will support the production of fingerlings in rehabilitated hatcheries and strengthen fishermen organizations; and
- c) ***Capacity building of fish value chain stakeholders:*** This activity will involve producers / fishermen, fishmongers, processors, retailers and restaurant keepers. It will include support to structure the value chain through technical training, workshops and exchange visits. Capacity building will involve about 1,100 actors, 40% of whom women and 10% youth.

**Component 3: Coordination, management, Monitoring & Evaluation (M&E) and capacity building (CFAF0.62 billion of which CFAF 0.57 billion GAFSP)**

74. PAMESAD will be anchored to the Agricultural Productivity and Food Security Project (PAPSA) as regards project management support services. This component therefore aims to strengthen the PAPSA operational arrangements so that the programming and implementation of PAMESAD activities and their monitoring & evaluation can be efficiently performed through PAPSA. In this perspective, and also in order to facilitate the project mid-term and ex-post evaluation, the following twin sub-components will be financed:

**Subcomponent 3.1: Project coordination, management and M&E**

75. In order to ensure an efficient technical support to the project and also to build on achievements and experiences of similar World Bank-supported projects, PAMESAD will be institutionally anchored with PAPSA. This project is an example of successful inter-ministerial cooperation and coordination of actions with the view to improving food security among vulnerable populations.

76. PAMESAD's Steering Committee will be the same as PAPSA's committee, with membership representing all four ministries concerned with rural development (MASA, MRAH, MEAHA and MEDD). In terms of day-to-day coordination, the respective specialized directorates of these ministries will be involved (DGPV, DGADI, DGDPA, DGPER, R&E, DGFF, BNEE, APD, etc.). These directorates will provide technical support and monitoring of field activities, including due consideration of environmental and climate change aspects. Control and execution activities will be carried out by the multidisciplinary teams of service providers and the staff of Regional Chambers of Agriculture (CRAs) acting in their capacity as entities with delegated responsibilities for project execution. The PAMESAD team will be embedded with the PAPSA Project Management Unit (PMU), under the authority of the PAPSA Coordinator serving as de facto Project Coordinator.

77. PAPSA PMU staff will be strengthened by the addition of the following staff: (i) a civil works engineer (specialist of irrigation development), (ii) an agronomist specialist of crop and livestock development, (iii) a specialist in charge of marketing infrastructure and the warehouse receipt ('warrantage') system, and (iv) a fisheries/aquaculture expert, as well as two other specialists respectively in Monitoring & Evaluation and procurement. The respective sections in charge of capacity building, Monitoring & Evaluation, and administrative and financial matters of the PAPSA Coordination Unit will also be reinforced with additional staff and adequate incremental operating means. PAPSA's Focal Points in the regions will be supported by specialists in crop, livestock and fisheries development and marketing as required from the decentralized ministries structures and from the Regional Chambers of Commerce.

78. PAMESAD will fund the additional staff posted with the PAPSA Management Unit, as well as all incremental equipment and operating expenditures for the PAMESAD team, including vehicles, office space, office equipment, office supplies and other operating expenditures including utilities.

### **Sub-component 3.2: Capacity building**

79. This sub-component will provide the required knowledge support for the implementation of project activities. It will contribute to build capacity, including training for project focal points, multidisciplinary teams, local technical staff as well as producer groups and individual producers. The project will provide special support to the establishment of irrigation committees and local water-user committees, including irrigation farmers and other stakeholders involved in water resources management at the sub-basin level.

#### **2.3 PAMESAD’s alignment with PNSR, CAADP and GAFSP**

80. PAMESAD implementation is embedded into the National Rural Sector Program (PNSR), and therefore fully aligned with PNSR. PNSR implementation, in turn, takes full account of the policies and strategies at international, regional, sub-regional and national levels. It is therefore fully aligned with all major guiding documents at those levels.

81. At international level, PNSR is expected to give Burkina Faso leverage to achieve the Millennium Development Goals 1 (MDG 1), namely the eradication of extreme poverty and hunger, by 2015 as originally agreed, or at least with a reasonable time lag. PNSR is further designed to be implemented as efficiently and effectively as possible in the spirit of the Paris Declaration on development aid effectiveness.

82. At the Africa-wide regional level, PNSR is aligned with the Comprehensive Africa Agriculture Development Program (CAADP). PNSR sub-programs are consistent with CAADP’s four pillars as presented in Table 3 below. Finally, PNSR implementation is guided by the Maputo Declaration (ratified by the Heads of State and Government of the African Union in July 2003) which prescribed *inter alia* an allocation of at least 10% of national budgets to agriculture with the view to providing at least 6% growth in the agriculture sector. PNSR funding will allow Burkina Faso to continue to adhere to the Maputo budget target and provide the basis to attain the 6% growth target.

**Table 3 - Coherence of PNSR strategies and programs with CAADP**

<b>PNSR Sub-programs</b>	<b>PDDAA Pillars</b>
<b>S/P 1-1:</b> Sustainable development of agricultural and fishery production	<b>Pillar 4:</b> Improvement of agricultural research, dissemination and adoption of technologies.  <b>Pillar 3:</b> Increase in the supply of food products, hunger alleviation and improving responses to food crises.
<b>S/P 1.2:</b> Improving animal productivity and competitiveness of animal production	
<b>S/P 1.3:</b> Improvement of animal health and public veterinary health	
<b>S/P 1.4:</b> Sustainable development of irrigated-agriculture	
<b>S/P 1.5:</b> Prevention and management of food and nutritional crises	
<b>S/P 2.1:</b> Promotion of agricultural economy	<b>Pillar 2:</b> Improvement of rural infrastructure and enhancement of capacities related to trade for market access.
<b>S/P 3.1:</b> Environmental governance and sustainable development	<b>Pillar 1:</b> Extension of the scope of sustainable land management and reliable water control

<b>PNSR Sub-programs</b>	<b>PDDAA Pillars</b>
<b>S/P 3.2:</b> Sustainable management of water, soil and land security in rural areas	systems.
<b>S/P 3.3:</b> Securing and management of pastoral resources	
<b>S/P 3.4:</b> Improvement of forest and wildlife productions	
<b>S/P 4.1:</b> Drinking water and sanitation	<i>(not included in CAADP)</i>
<b>S/P 4.2:</b> Environmental sanitation and improvement of the living environment	<i>(not included in CAADP)</i>
<b>S/P 5.1:</b> Steering and support	<b>Pillar 4:</b> Improvement of agricultural research, dissemination and adoption of technologies.

83. At the sub-regional level, PNSR falls within the framework of the common agricultural policies established under ECOWAS and WAEMU. ECOWAS' objective is 'the development of agriculture and the maximum use of all the potential of this sector, taking into account the complementarities between ecological zones, in order to ensure food self-sufficiency within the sub-region'. As to WAEMU, it aims to 'contribute in a sustainable way to meeting the food needs of the population of the region, the economic and social development of member states and poverty reduction in rural areas.'

84. At the national level, PNSR is set in the framework of the short, medium and long term development strategies defined in the Burkina 2025 prospective study, the National Land Planning Scheme (SNAT), and, more recently, the Strategy of Accelerated Growth and Sustainable Development (SCADD).

85. The links between PAMESAD and PNSR are summarized in [Table 4](#) below. As part of PNSR implementation it is envisaged the establishment of a mechanism for the evaluation and capitalization of project achievements through the Irrigated Agriculture Sub-sector Consultation Framework (CCASI). In spite of the resources already pledged by development partners following the last PNSR round table, PNSR implementation still faces a funding gap. The resources mobilized under the GASFP will help reduce this gap by approximately one tenth.

**Table 4: Links between PAMESAD (GAFSP proposal) and PNSR**

<b>PNSR Pillars</b>	<b>PNSR sub-programs</b>	<b>PAMESAD components (GAFSP)</b>
Pillar 1: <i>Improved food security and sovereignty</i>	(1.4) <i>Sustainable development of irrigated-agriculture (focus GAFSP request)</i>  (1.1) Sustainable development of agricultural production  (1.2) Improvement of the productivity and competitiveness of animal productions	1. Irrigation schemes <i>Support to irrigation schemes for crop production, the development of water access facilities for animal production, and the construction of fish farming infrastructure in the project intervention areas.</i> 2. Increasing irrigated food production <i>Support to crop production (maize, rice and market gardening crops such as tomato and onion), as well as conservation and processing units tomato and onions</i> <i>Support to bovine / ovine fattening</i>
Pillar	(2.1) Promotion of agricultural	2. Increasing irrigated food production

2: <i>Increased incomes of rural populations</i>	economy or of access to water	<i>Use of value chain approach and capacity building in the of rice, corn, tomato, onion and fish production value chains.</i>
Pillar 3: <i>Sustainable development of natural resources</i>	(3.2) Sustainable management of water and soil, land security in rural areas (3.3) Securing and management of pastoral resources (3.4) Improved forest and wildlife and fisheries production	2. Increasing irrigated food production <i>Support to sustainable management of water resources and developed irrigated lands; support to fodder crop production and improved management of natural fodder; and support to fishery production.</i>
Pillar 5: <i>Development of partnership between actors of the rural community</i>	(5.1) Steering and support, federating sub-program dedicated to coordination and the management of the whole rural sector	3. Coordination, management, monitoring and evaluation of the project <i>Institutional anchoring of the project within PAPSA; Building the capacity of service providers, systems of input supply, organizational and technical capacities of producers/irrigation farmers; further capacity building of technical fiduciary teams.</i>

## 2.4 Implementation arrangements and role of other stakeholders

86. ***Project Steering Committee.*** The project steering committee will be chaired by the General Secretariat of the MASA. Members will also include representatives of the other three ministries involved in the rural sector (MRAH, MEAHA and MEDD), and the respective directorates and units of all four ministries at central and regional level (including DRASAs, DRAHs and DREAHAs). The steering committee membership will also include the representatives of the local elected organizations, the Regional Chambers of Agriculture (CRAs) and the producers' organizations involved in project implementation in the three targeted regions.

87. ***Implementation arrangements.*** PAMESAD will be implemented, as much as possible, based on outsourcing principles, particularly as part of public-private partnerships and delegated-management contracts. Quality control will be ensured by the local communities and the Regional Chambers of Agriculture (CRAs) at local level under the technical supervision of the Regional Rural Sector Directorates. To speed up project implementation, the assistance of delegated implementing agencies (e.g., AGETEER, FEER) will be requested for procurement activities. The project will develop permanent professionally-equipped service providers in support of the selected value chains in targeted regions. It will capitalize on past lessons from experience by developing synergies and complementarities with existing projects (PAPSA, PAFASP, Bagré Growth Pole, etc.)

## 2.5 Rationale for resorting to public financing

88. The share of the PNSR total budget of Sub-program 1.4 'Sustainable development of irrigated agriculture' has declined markedly in recent years, from 27% in 2011 to 18% currently. It is expected to further decrease to 15% by 2015. This reflects the significant reduction in external funding. In addition, there is still reluctance amongst private investors, in the face of

climate change, to take the risk to develop irrigation in the absence of public investment. Consequently, the use of public funding is needed to support vulnerable populations in regions structurally prone to food deficit. Food security and sovereignty is one of the most important missions of a State such as Burkina Faso where a large fraction of the population is still faced with food insecurity. Mobilizing additional resources for PNSR Sub-program 1.4 is therefore key to achieving the PNSR goals in terms of increasing the share of irrigated crops, cattle and fish production in overall country's agricultural output.

## 2.7 Amount of funding required

89. The consolidated budget of the project is approximately CFAF 20.6 billion of which 18.5 billion are requested from GAFSP. The difference corresponds to contributions from the State and beneficiaries (the breakdown is shown in [Table 5](#) below). The amount of this request represents 3.5% of the PNSR funding gap (not including pledges).

**Table 5: Consolidated PAMESAD costs**

Project Components / sub-components	GAFSP Request	State & beneficiaries	Total Project cost
	(billions CFAF)		
<b>Component 1 : Irrigation and related infrastructure</b>	<b>12.09</b>	<b>1.34</b>	<b>13.44</b>
1.1: Infrastructure for irrigated/ lowland crop production	10.30	1.14	11.44
1.2: Infrastructure for cattle and sheep fattening/finishing	0.24	0.03	0.27
1.3: Infrastructure for fish farming	1.55	0.17	1.73
<b>Component 2 : Support for Agriculture development</b>	<b>5.81</b>	<b>0.65</b>	<b>6.46</b>
2.1: Support for crop production	1.68	0.19	1.87
2.2: Support for cattle and sheep fattening /finishing	3.43	0.38	3.81
2.3: Support to fish production	0.69	0.08	0.77
<b>Component 3 : Project management, coordination, M&amp;E and capacity building</b>	<b>0.63</b>	<b>0.07</b>	<b>0.70</b>
3.1: Management, coordination and M&E	0.35	0.04	0.39
3.2: Capacity building	0.28	0.03	0.31
<b>Grand Total</b>	<b>18.54</b>	<b>2.06</b>	<b>20.60</b>

## 2.8 Supervising agency and government team

90. The World Bank will be the supervising agency for PAMESAD's GAFSP financing. The Bank already oversees the implementation of PAPSA with which this project is integrated. In addition, several of the strategies underlying the targeted interventions under PAMESAD are based on successful experiences from the World Bank, in partnership with other development partners. The government team consists of the PAPSA management team which will be strengthened under PAMESAD to accommodate the incremental needs of the project. It also consists of the regional rural sector directorates which will play a central role in overseeing project implementation on the ground.

## 2.9 Timeframe for the proposed financial aid and risk management

91. Project implementation is planned over a four-year period (2014-17). It is construed as the first phase of a longer term program to be supported by the World Bank and other development partners. The program will aim at increasing and stabilizing agricultural production through improved water resources management, with the view to mitigating the negative impact of climate change and addressing the food and nutritional requirements of an increasing population - especially women and children - in the project-targeted areas. Annex 3 presents PAMESAD's Results Framework, and Annex 4 the results indicators, including the arrangements for data collection related to these indicators.

92. PAMESAD overall is a moderate risk project. The potential risks associated with project implementation and corresponding risk mitigation measures are presented in Table 6 below. The Government is giving very high priority and great importance to food security. Hence it is expected that it will be very actively looking for solutions for those aspects that have a moderate risk rating, particularly those related to the coordination amongst stakeholders.

**Table 6: Project risks and mitigation measures**

<b>1. Project Stakeholder Risks</b>	<b>Rating</b>	Moderate
<b>Description:</b> <ul style="list-style-type: none"> <li>Overlapping mandates between some stakeholders (government agencies) and poor definition of each stakeholder role and mandate can hamper project implementation.</li> <li>Tension among project beneficiaries field level in the selection of what basic infrastructure to finance.</li> </ul>	<b>Risk Management:</b> <ul style="list-style-type: none"> <li>The Project Steering Committee in close liaison with PAPSA will be able to address such issues</li> <li>The Government is giving very high priority and great importance to food security and has been very keen on looking for solutions</li> <li>The project will ensure consultation with stakeholders and define clear criteria and selection process.</li> </ul>	
<b>2. Capacity</b>	<b>Rating:</b>	Low
<b>Description :</b> <ul style="list-style-type: none"> <li>Insufficient capacity at several level may hamper project implementation, in particular:</li> <li>Low capacity for project management</li> <li>Low capacity of producer groups at field level</li> <li>Low capacity for M&amp;E in the project targeted regions</li> </ul>	<b>Risk Management:</b> <ul style="list-style-type: none"> <li>Management will be ensured by the PAPSA Management Unit that will be strengthened with incremental staff specifically assigned to PAMESAD</li> <li>Under Sub-Component 3.3 training will be provided based on a needs assessment</li> <li>Specific technical training will be provided under each sub-component</li> <li>MASA's decentralized unit will receive support for M&amp;E at the regional level.</li> </ul>	
<b>3. Project Risks</b>		
<b>3.1. Design</b>	<b>Rating:</b>	Low
<b>Description:</b> <ul style="list-style-type: none"> <li>Unavailable or inappropriate improved methods and tools might lead to unsustainable outputs and outcome in reference to irrigation development</li> </ul>	<b>Risk Management:</b> <ul style="list-style-type: none"> <li>Burkina Faso has a good track record for irrigation development both reservoir-based and bottomlands. It has acquired good scientific and technical tools</li> <li>The lessons from other projects (PAPSA and PAFASP particularly for irrigation and cattle, and WAAPP for seed production and crop development) have been taken into consideration in project design; close liaison will be maintained with these projects during PAMESAD implementation</li> </ul>	



<b>1. Project Stakeholder Risks</b>	<b>Rating</b>	Moderate
<b>3.2. Environmental</b>	<b>Rating:</b>	Moderate
<b>Description :</b> <ul style="list-style-type: none"> <li>• Climate change may undermine the gains of irrigation management practices</li> <li>• Natural disasters (droughts or floods) in some areas and resulting ecological damage may affect the integrity of the irrigation works and/or cause displacement of populations</li> </ul>	<b>Risk Management :</b> <ul style="list-style-type: none"> <li>• Project covers the Center East, Center South and Sahel region, specifically the areas with water bodies that have potential to be developed and/or rehabilitated</li> <li>• All existing possibilities for water harvesting will be used for the development of fully irrigated lands, based on the basin and sub-basin approach, and for supplementary irrigation around reservoirs</li> <li>• Feasibility studies for an in-depth diagnostic of sites will be conducted</li> </ul>	
<b>3.3. Social and Economic</b>	<b>Rating</b>	Low
<b>Description:</b> <ul style="list-style-type: none"> <li>• The limited profitability of some project activities may provide insufficient incentive to producers to adopt innovations</li> <li>• The low participation in implementation activities may lead to insufficient ownership of project activities by the beneficiary populations</li> <li>• Unsuccessful experiences of past irrigation projects may hinder enthusiasm of beneficiaries</li> <li>• Land issues may be of constraint</li> <li>• Lack of market access and fluctuation of prices may be a disincentive</li> </ul>	<b>Risk Management :</b> <ul style="list-style-type: none"> <li>• Targeted areas will be those that offer best potential for selected value chains; this will ensure strong ownership by beneficiaries as they benefit greatly from increased incomes and food security</li> <li>• Involvement of private sector and local communities in the implementation, development and management of water management will be emphasized</li> <li>• Application of the land law and active monitoring and prevention of land conflicts will be ensured</li> <li>• Construction of storage structures and implementation of warrantage scheme will reduce post-harvest losses and give more price negotiating power to producers</li> </ul>	
<b>3.4. Project management</b>	<b>Rating:</b>	Low
<b>Description:</b> <ul style="list-style-type: none"> <li>• Coordination of project activities among three lines ministries may prove difficult and may slow project implementation</li> <li>• M&amp;E activities may be given insufficient importance as compared to project management activities</li> <li>• Delays may hamper implementation as regards: (i) making funds available for the execution of time sensitive field activities, (ii) procurement: delays in the award of contracts; and (iii) poor governance resulting in poor selection and possible collusion of service providers with the management of the project</li> </ul>	<b>Risk Management:</b> <ul style="list-style-type: none"> <li>• Project activities are closely integrated into PNSR that offers a good framework for coordination, monitoring and evaluation, provision of addition capacity building, including training to stakeholders involved in project implementation</li> <li>• Separation of monitoring and evaluation budget from the overall management budget, and emphasis on capitalization of project results</li> <li>• Using the PAPSA project management unit with good track record in fiduciary compliance, including financial management and procurement</li> <li>• Delegated management contracts with established entities with good track record for procurement activities</li> <li>• Additional capacity building to be provided on need basis</li> </ul>	

## 2.10 Financial and economic analysis

93. The economic and financial analysis of PAMESAD's investments shows that the project will have large incremental beneficial results. It is expected to result in substantially higher yields for maize and rice, respectively 101% and 185%. This reflects the current yield gap between irrigated and rainfed crops. Similarly, the yield of onions and tomatoes is expected to increase by 66% and 56% respectively (based on PAFASP data). The planned interventions in support of cattle and sheep fattening are expected to raise carcass weight by 50% for cattle and 75% for sheep. Based on pilot experience in Burkina Faso, the amount of fish per hectare in the

targeted water bodies should increase from 80 kg/ha to 400 kg/ha for stocked water bodies exploited by capture, and up to 4,000 kg/ha under fish farming in ponds or cages.

94. The significant increase in yields is expected to have an extremely positive effect on the value of crop revenues, once the phase of asset recapitalization is over and producers reach a steady state. Rice producers' incomes would double whereas those of maize producers would increase by about 128%. This substantial increase results both from expected increase in production (mainly due to irrigation water) and decrease in post-harvest losses (due to the use of projects supported storage sheds), as well as price increase resulting from the enhanced quality of the production and the warrantage system that will enable producers to market at a time where prices are higher. Fishermen and fish farmers are also expected to benefit from significant improvement of their incomes, reaching up to four times their initial incomes based on the stocking of reservoirs and improved fish farming practices. Meanwhile, the additional income from improved fattening activities is expected to be approximately 50% for cattle and 75% for sheep vs. traditional practices.

95. The internal rate of return (IRR) of the project in financial prices is estimated at 63.7%, in a situation where the Government does not subsidize inputs. This IRR nearly doubles (110.9%) when inputs are subsidized at 50%, as currently practiced by the Government as part of its policy to boost cereal production. In economic terms, the IRR is 29.1%. The net present value (NPV) is CFAF 17.1 billion at the 12% discount rate corresponding to the cost of investment funding for Burkina Faso. These results remain very robust to increases in production costs and reductions in output prices, indicating that the economic risks of the project are relatively low (Table 7). With a 20% increase in production costs, without the subsidy, the IRR decreases to 56.1% and 26.5% in financial and economic terms respectively. Similarly with a 20% decrease in output prices the IRR decreases to 39.5% and 19.7%. This testifies to the robustness of the project economic and financial profitability.

**Table 7: Summary economic and financial analysis results**

<b>Internal rate of return</b>			
	<b>Financial</b>	<b>Economic</b>	<b>Financial with 50% input subsidy</b>
<b>Internal Rate of Return (IRR)</b>	<b>63.7%</b>	<b>29.1%</b>	<b>110.9%</b>
<b>Net Present Value (NPV) (CFAF billion)</b>			
▪ Interest Rate (0%)	64.0	58.9	66.8
▪ Interest Rate (12%)	17.1	12.5	19.2
<b>Sensitivity analysis</b>			
▪ Production costs increase by 10%	59.8%	27.8%	102.8%
▪ Production costs increase by 20%	56.1%	26.5%	95.2%
▪ Output prices decrease by 10%	50.8%	24.4%	79.4%
▪ Output prices decrease by 20%	39.5%	19.7%	56.7%

96. The analysis of PAMESAD's macroeconomic impact, made with the same model used by the external review of the PNSR<sup>11</sup>, shows a project's contribution to agricultural GDP growth of 0.6% per year. This is to be compared with the expected impact of the entire PNSR on agricultural GDP growth which was estimated by the external review at 6.2% year. This testifies to the PAMESAD's much larger impact on GDP relative to its cost, bearing in mind that this cost is only 1.5% of the overall PNSR cost. Everything else being equal, therefore, one franc invested in PAMESAD will generate seven times more gain growth compared to the basic programming of the PNSR. In social terms, the analysis of the impact on food security made using micro-simulation data from the annual household survey of agricultural production shows that the expected additional income at household level will allow increased access capabilities in grain equivalent terms equal to 98 kg/person/year (at constant 2011 prices). This will result overall in five percentage point reduction in the proportion of vulnerable households that do not cover their cereal needs of 190 kg/person/year in the without project scenario.

## **2.11 Consultation with stakeholders and development partners at national level**

97. PAMESAD implementation is embedded into PNSR. PNSR has followed a long participatory preparation process whereby all stakeholders and development partners were consulted. This process was initiated on April 30, 2010 through the issuance of a scoping paper by the Ministers in charge of Burkina Faso's rural sector. This was followed by an extensive review of the country's rural sector, held in July 2010 which defined the main areas of concentration for the Program. This review set the stage for the signature of a compact on July 22, 2010 that reflected stakeholders' support to the PNSR process. The compact was signed by all key stakeholders of the rural sector, including the Government, the agricultural professional organizations, the civil society's organizations and the private sector, as well as the regional and sub-regional organizations (ECOWAS and NEPAD) and development partners.

98. To ensure proper steering of the PNSR process, three committees were established: (i) the Coordination Committee (CC-PNSR) responsible for preparing the Program; (ii) the Inter-Ministerial Technical Committee (CTI-PNSR), chaired by the General Secretaries of the four line ministries involved in the rural sector, with the task to provide policy guidance to the PNSR process; and (iii) the Steering Committee (COP-PNSR), co-chaired by the four line ministers, and with the mission to guide and approve program's orientations. In addition to these committees, various working groups were set up to work on the detailed description of sub-programs. Inputs from these groups were consolidated into the first comprehensive program document, which was discussed at the first CTI-PNSR session on September 2, 2011. The Permanent Secretariat in charge of the Coordination of the Agricultural Sector Policies (SP/CPSA) played the central role in coordinating the preparation of the PNSR. The Secretariat received support from various African and international organizations which reviewed the document, as per the CAADP guidelines.

99. The first session of COP- PNSR of March 19, 2012 and the Business Meeting of March 26, 2012 were used to develop a blueprint for the revision of PNSR and pave the road for larger

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<sup>11</sup>This model was developed by IFPRI and used in the assessment of macroeconomic and poverty implications of scaled up investments in the agriculture sector under the CAADP process.

and more predictable support of development partners, as well as an effective participation of all stakeholders in the implementation of the rural sector program. The stakeholders' commitment to work in partnership toward the attainment of the program's objectives was reaffirmed. Since the submission of the 2012 GAFSP request, PNSR has received full government endorsement at the Council of Government chaired by the President of the Republic on December 2012. It is expected that this request will cover 3.5% of PNSR financing gap (excluding pledges) and up to 8% of this gap if current pledges (Business Meeting and new G8 Alliance on Food Security) are included.

SIGNATURES

<p>The Minister of Agriculture and Food Security</p>   <p><b><u>Mahama ZOUNGRANA</u></b> <i>Officer of the Ordre National</i></p>	<p>For the Group of the Financial and the Technical Partners</p>   <p><b><u>PERSAUD Santhosh</u></b> <i>Representative of German Cooperation Lead</i></p>
<p>The Minister of the Economy and Finances</p>   <p><b><u>Lucien Marie Noël BEMBAMBA</u></b> <i>Officer of the Ordre National</i></p>	

### **Annex 1: Cost of PNSR sub-programs**

<b>Sub-programs</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total (CFAF billion)</b>	<b>Total (USD million)</b>	<b>%</b>
1.1. Sustainable development of agricultural and fishery production	21.3	24.2	37.4	40.5	42.3	<b>165.7</b>	<b>368</b>	12.0
1.2. Improving animal productivity and competitiveness of animal production	8.0	23.8	24.4	24.4	24.7	<b>105.3</b>	<b>234</b>	7.6
1.3. Improvement of animal health and public veterinary health	2.8	6.2	5.0	6.0	6.7	<b>26.6</b>	<b>59</b>	1.9
1.4. Sustainable development of hydro-agriculture	52.2	48	49.8	48.7	49.2	<b>248</b>	<b>551</b>	18.0
1.5. Prevention and management of food and nutritional crises	1.7	8.6	9.7	10.0	10.2	<b>40.1</b>	<b>89</b>	2.9
2.1. Promotion of agricultural economy	10.5	16.6	20	20.5	19.9	<b>87.4</b>	<b>194</b>	6.3
3.1. Environmental governance and sustainable development	1.4	1.0	2.0	2.0	2.1	<b>8.5</b>	<b>19</b>	0.6
3.2. Sustainable management of water, soil and land security in rural areas	4.0	7.1	8.2	6.0	6.0	<b>31.3</b>	<b>70</b>	2.3
3.3. Securing and management of pastoral resources	2.8	12.4	47.7	47.7	47.7	<b>158.3</b>	<b>352</b>	11.5
3.4. Improvement of forest and wildlife productions	4.4	13.5	13.6	13.9	16.9	<b>62.3</b>	<b>139</b>	4.5
4.1. Drinking water and sanitation	51.6	39.7	64.6	61.1	68.4	<b>285.5</b>	<b>634</b>	20.7
4.2. Environmental sanitation and improvement of the living environment	1.0	3.3	3.3	3.4	3.5	<b>14.5</b>	<b>32</b>	1.1
5.1. Steering and support	29.8	28	29.1	25.6	30.7	<b>143.3</b>	<b>319</b>	10.4
<b>PNSR Total</b>	<b>191</b>	<b>232</b>	<b>315</b>	<b>310</b>	<b>328</b>	<b>1 377</b>	<b>3060</b>	100.0

**Annex 2: Evaluation of the funding Gap (CFAF billion)**

<b>Year</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>TOTAL</b>
<b>Overall (real) funding requirement</b>	191.4	232.4	314.8	309.9	328.2	<b>1 377</b>
<b>Acquired funding</b>						
State/local authorities' own resources	46.4	62.4	70.9	72.8	73.5	326.1
External resources	145.0	105.0	68.8	44.4	27.6	390.9
NGO/CSO		7.0	9.4	9.3	9.8	35.6
Private sector		16.3	22.0	21.7	23.0	83.0
OPA/Beneficiaries		2.3	3.1	3.1	3.3	11.9
<b>Financing gap</b>						
<b>Gap to search for</b>	<b>0.0</b>	<b>39.5</b>	<b>140.5</b>	<b>158.6</b>	<b>191.0</b>	<b>529.5</b>

### Annex3: Project Results Framework

<b>Project Development Objective (PDO)</b>	<b>Overall Project</b>	<b>Output indicators</b>	<b>Use of the information</b>
Increase agricultural production and achieve food security among targeted stakeholders in the cereal, horticulture, livestock and fish value chains of the food-deficit areas of the Center-East, Center-South and Sahel regions of Burkina Faso		1. Number of direct beneficiaries of the project, of which 30% women and 10% youth	- Estimate of number of producers who: (i) adopt partial and full irrigation technology for agricultural production against dry spells, and(ii) increase their farm income from dry season farming, fisheries and livestock. - Monitor the food situation of vulnerable populations.
		2. Increased agricultural and fisheries production (rice, corn, vegetables and fish)	
		3. Increased carcass weight of livestock (kg/head)	
		4. Reduction of the % households that do not meet the needs of food consumption of 190kg/person/ year in cereals	
<b>Intermediate Results</b>	<b>Subcomponent</b>	<b>Indicators of Intermediate Results</b>	<b>Use of the Information</b>
<b>Component 1: Irrigation and related infrastructure</b>			
Reinforcing water resources access infrastructures	<i>Sub-component 1.1. Infrastructure for irrigated/ lowland crop production</i>	1.1a. Developed area(ha) disaggregated by rainfed crops(rice and maize) and vegetables 1.1a Volume of crop stored (rice and maize)	Evaluation of the ability of producers to cope with the impacts of dry spells due to climate change(mitigation and adoption capacity)
	<i>Sub-component 1.2:Infrastructure for cattle and sheep fattening/finishing</i>	1.2.Number of cattle fattening units installed around water bodies	
	<i>Sub-component1.3:Infrastructure for fish farming</i>	1.3.Number of fishing enclosures 1.4 Number of fishing inputs stores	
<b>Component 2 : Agriculture development</b>			
Farmers increase their yields by adopting effective irrigation technologies to protect crops against dry spells	<i>Subcomponent 2.1. Support to crop production (maize, rice and vegetables)</i>	2.1Area farmed in rainfed crops(rice) and dry season(maize, onion, tomato)	Evaluation of the ability of producers (i) to cope with the impacts of dry spells due to climate change(mitigation and adoption capacity), (ii) to adopt technologies
		2.2.Producershaving access to irrigation schemes	
	2.3 Percentage of farmers trained in the project area to the techniques of production under irrigation		
Breeders who adopt cattle fattening practices	<i>Subcomponent2.2:Support for cattle fattening/finishing model</i>	2.4.Quantity of agricultural by-products and fodder produced	Evaluation of the ability of producers to access intensive



<b>Project Development Objective (PDO)</b>	<b>Overall Project</b>	<b>Output indicators</b>	<b>Use of the information</b>
		2.5 Number of animals fattened	breeding techniques and to cope with climatic stress and animal health
Fish producers increase their fishing income by increasing the productivity of water bodies	<b><i>Subcomponent 2.3: Support for fish production</i></b>	2.6.Area (ha) of water bodies stocked	Evaluation of additional income generated by fishing activity
		2.7.Quantity of fish per hectare in targeted water bodies	
<b>Component 3: Management, coordination, M&amp;E and capacity building</b>			
	<b><i>Subcomponent 3.1:Management, coordination and M&amp;E</i></b>	3.3 The system of monitoring and evaluation of the project regularly collects and disseminates information on out comes and impacts of the project to decision makers	Ensure that technical and institutional management is effective and that corrective action for any malfunctions are implemented on time
		<b><i>Sub-component 3.2: Capacity Building</i></b>	3.1.Percentage of retaining reservoirs with functional self-management organizations of common resources
	3.2.Percentage of self-management committees formed		

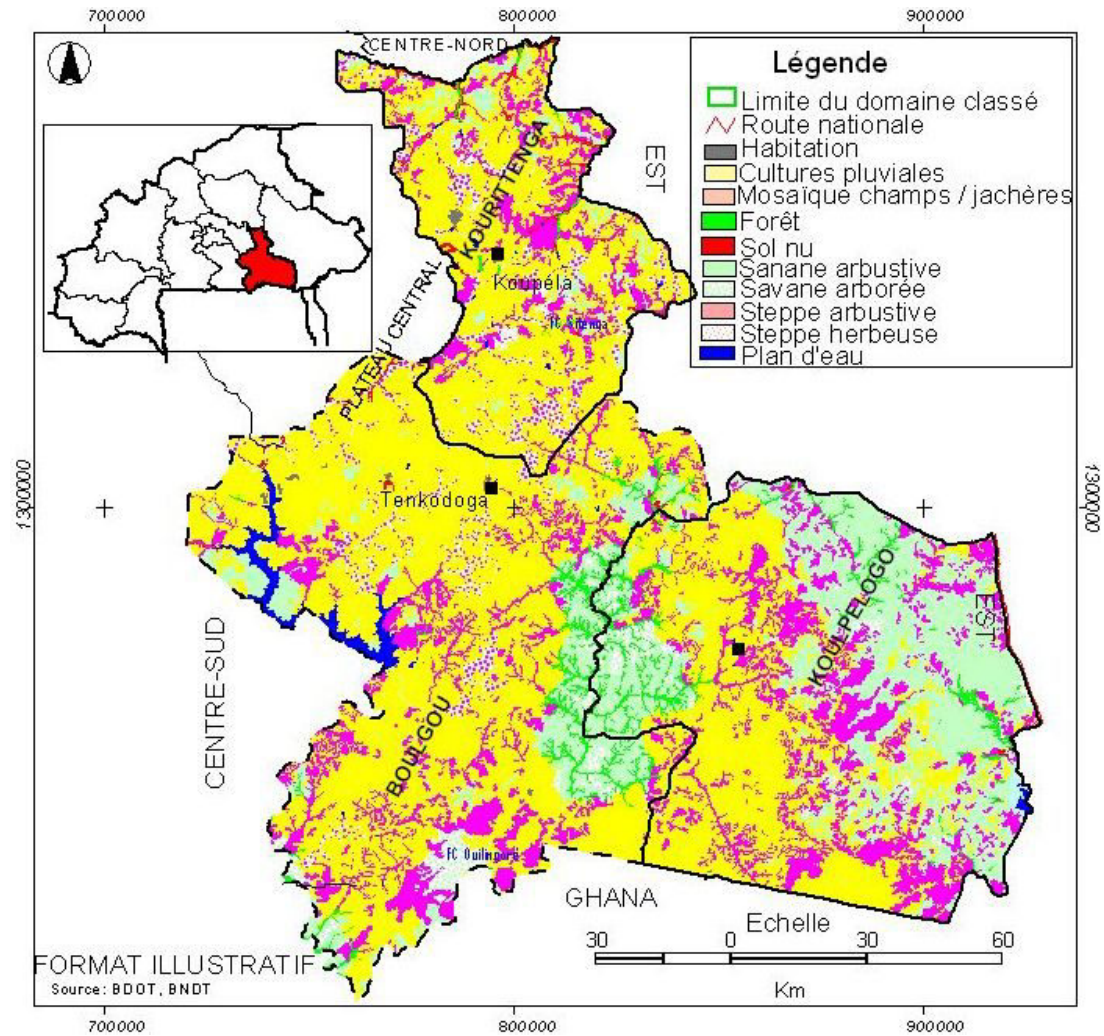
#### Annex 4: Framework for monitoring project indicators and institutional arrangements for M&E

Project indicators	Reference situation	At project end	Project input	2014	2015	2016	2017	Reporting periodicity	Data collection tools	Institution responsible for the data collection
1. Number of direct beneficiaries (*000), of which 30% women and 10% youth	0	250	250	25	100	200	250	annual	M&E of the Project	Project M&E
Women	0	100	100	10	35	75	100	annual		
Youth	0	25	25	5	15	25	25	annual		
Other beneficiaries	0	125	125	10	50	100	125	annual		
2. Increase of ag. production (rice, maize, vegetables *000 tons)	55.5	87.7	32.2	55.5	68.5	78.5	87.7	annual	Project M&E of the Project/Survey	DGPER
Maize (irrigated)	2.0	4.1	2.1	2.0	2.8	3.5	4.1	annual		
Rice (irrigated)	32.0	33.5	1.5	32.0	32.6	33.1	33.5	annual		
Onion	4.5	21.9	17.4	4.5	11.5	16.7	21.9	annual		
Tomato	17.0	28.2	11.2	17.0	21.5	24.9	28.2	annual		
3. Increase of the carcass yield of livestock in the area (in kg / head)									Project M&E of the Project/Survey	DGPSE
Cows	113	170	57	113	130	150	170	annual		
Sheep	9	16	7	9	12	15	16	annual		
4. Reduction of the fraction of households not meeting the needs of food consumption of 190kg/person/ year in cereals (%)	59%	52%	-7%	58%	56%	54%	52%	annual	Project M&E of the Project/Survey	DGPER
<b>Component 1: Irrigation and related infrastructure</b>										
1.1 Developed irrigated areas (*000 ha)	14.8	16.8	2.0	15.0	16.1	16.8	16.8	annual	Project M&E	DADI/DGPV
1.2. Number of cattle fattening units installed around the water bodies (number)	0	500	500	75	325	500	500	annual	Project M&E	DGPA/MRA
1.3. Number of fishing enclosures built (number)	0	150	150	25	100	150	150	annual	Project M&E	DGPA/MEDD
1.4 Number of stores of fishing inputs (number)	-	3	3	0	3	3	3	annual	Project M&E	DGPA/MRA
<b>Component 2: Improvement of irrigated food production</b>										
2.1 Area farmed in rainfed crops (rice) and dry season (corn, onion, tomato) crops (ha)	14.8	16.8	2.0	15.0	16.1	16.8	16.8	annual	Project M&E	DADI/DGPV
Maize (irrigated)	12.3	12.6	0.3	12.4	12.5	12.6	12.6			
Rice (irrigated)	0.3	1.0	0.7	0.4	0.8	1.0	1.0			

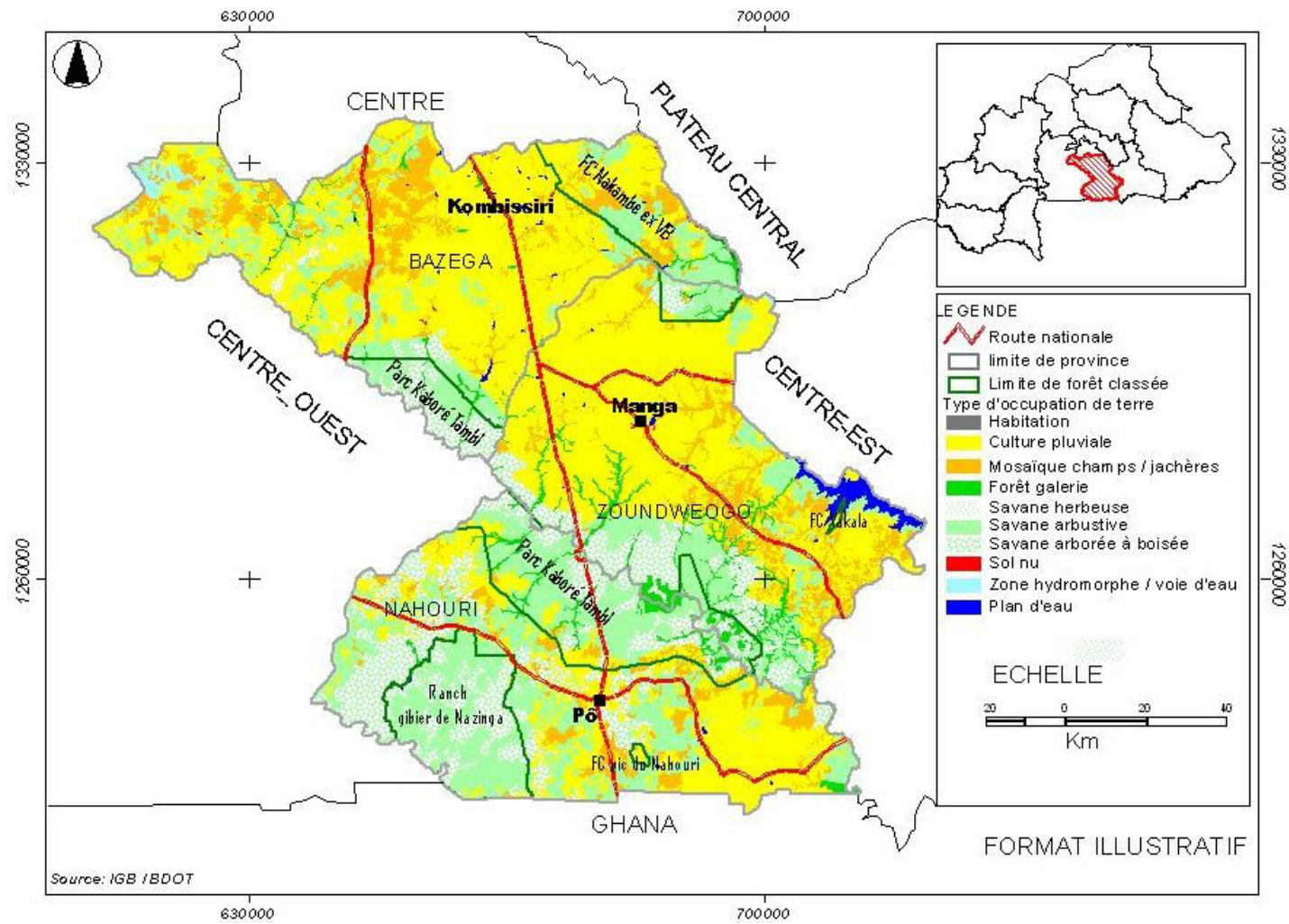
Project indicators	Reference situation	At project end	Project input	2014	2015	2016	2017	Reporting periodicity	Data collection tools	Institution responsible for the data collection
Onion	1.0	1.3	0.3	1.0	1.1	1.3	1.3			
Tomato	1.2	1.9	0.7	1.2	1.7	1.9	1.9			
2.2. Producers having access to irrigation schemes ('000 of producers)	53.4	106.7	53.3	5	39	53.4	53.4	annual	M&E of the Project	DGADI/DGPV
2.3 Percentage of beneficiary farmers trained in the project area in the techniques of production under irrigation (%)	0	100%	100%	10%	75%	100%	100%	annual	M&E of the Project	DGADI/DGPV
2.4. Quantity of agricultural by-products and fodder produced 4 T/ha* 500 ha (tons)	0	2,000	2,000	500	1,400	2,000	2,000	annual	M&E of the Project	DGPA/MRA
2.5 Number of animals fattened (number)	0	22,500	22,500	5,500	15,500	22,500	22,500	annual	M&E of the Project	DGPA/MRA
2.6. Area of water bodies stocked with fish (ha)	0	1,350	1,350	135	750	1,000	1,350	annual	M&E of the Project	DGPA/MEDD
2.7. Quantity of fish per hectare in targeted water bodies (kg/ha)	80	400	320	50	200	350	400	annual	M&E of the Project	DGPA/MEDD
<b>Component 3: Management, coordination, monitoring &amp; evaluation and capacity building</b>										
3.1. Percentage of retaining reservoirs with functional self-management organizations of common resources (%)	0	90%	90%	70%	80%	90%	90%	annual	M&E of the Project	DOPAIR/DGFOMR
3.2. Percentage of self-management committees formed (%)	0	100%	100%	25%	50%	100%	100%	annual	M&E of the Project	DOPAIR/DGFOMR
3.3. Number of irrigation and fish farming technicians in support to PAPSA field teams (number)	0	8	8	8	8	8	8	annual	M&E of the Project	M&E of the Project

## Annex 5 - Maps

### Map 1: Centre East Region



**Map 2: Centre South Region**





**Map 3: The Sahel Region**

