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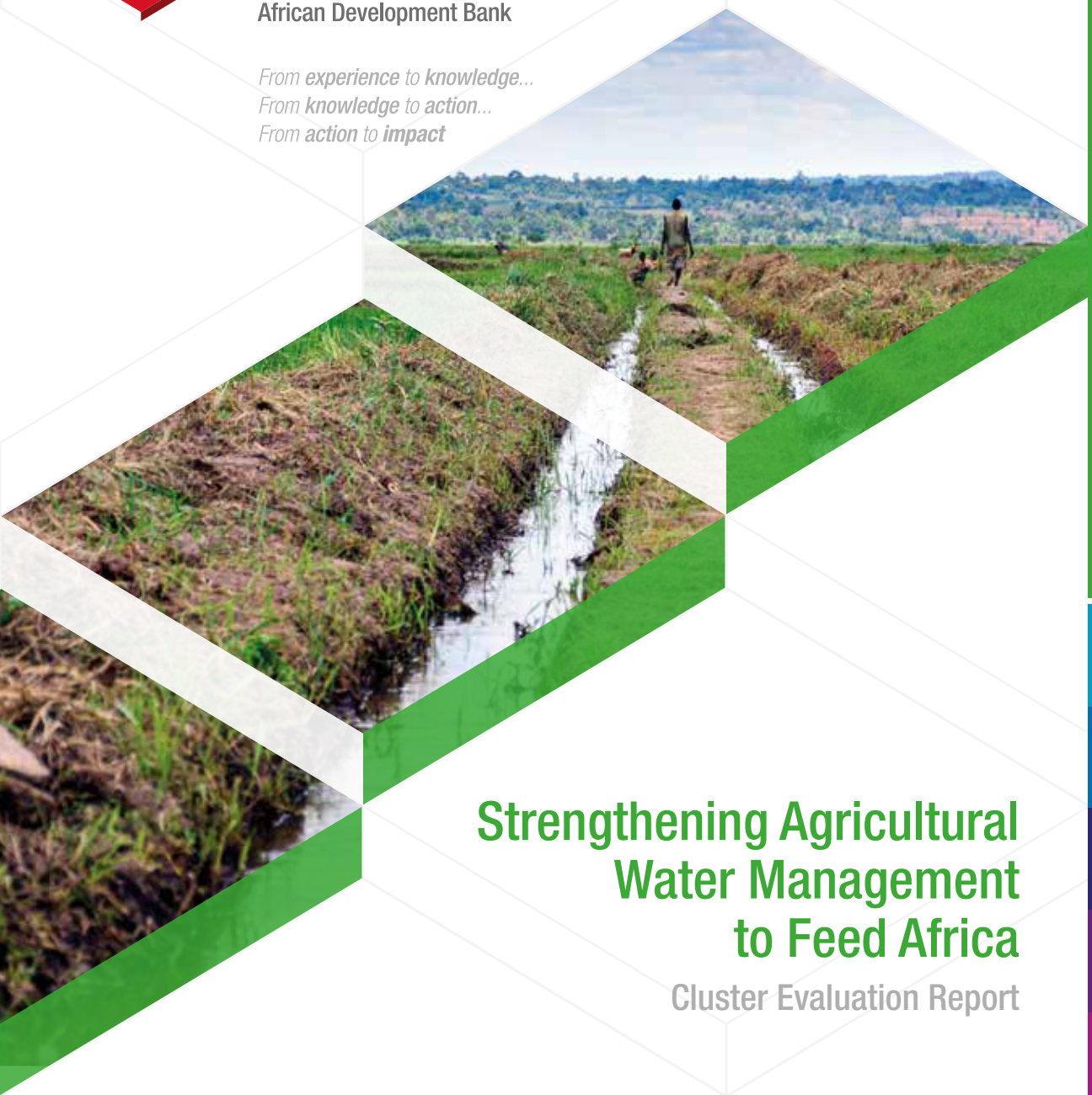

An IDEV **Project Cluster Evaluation**

Strengthening Agricultural Water Management to Feed Africa

Cluster Evaluation Report

AFRICAN DEVELOPMENT BANK GROUP

January 2020

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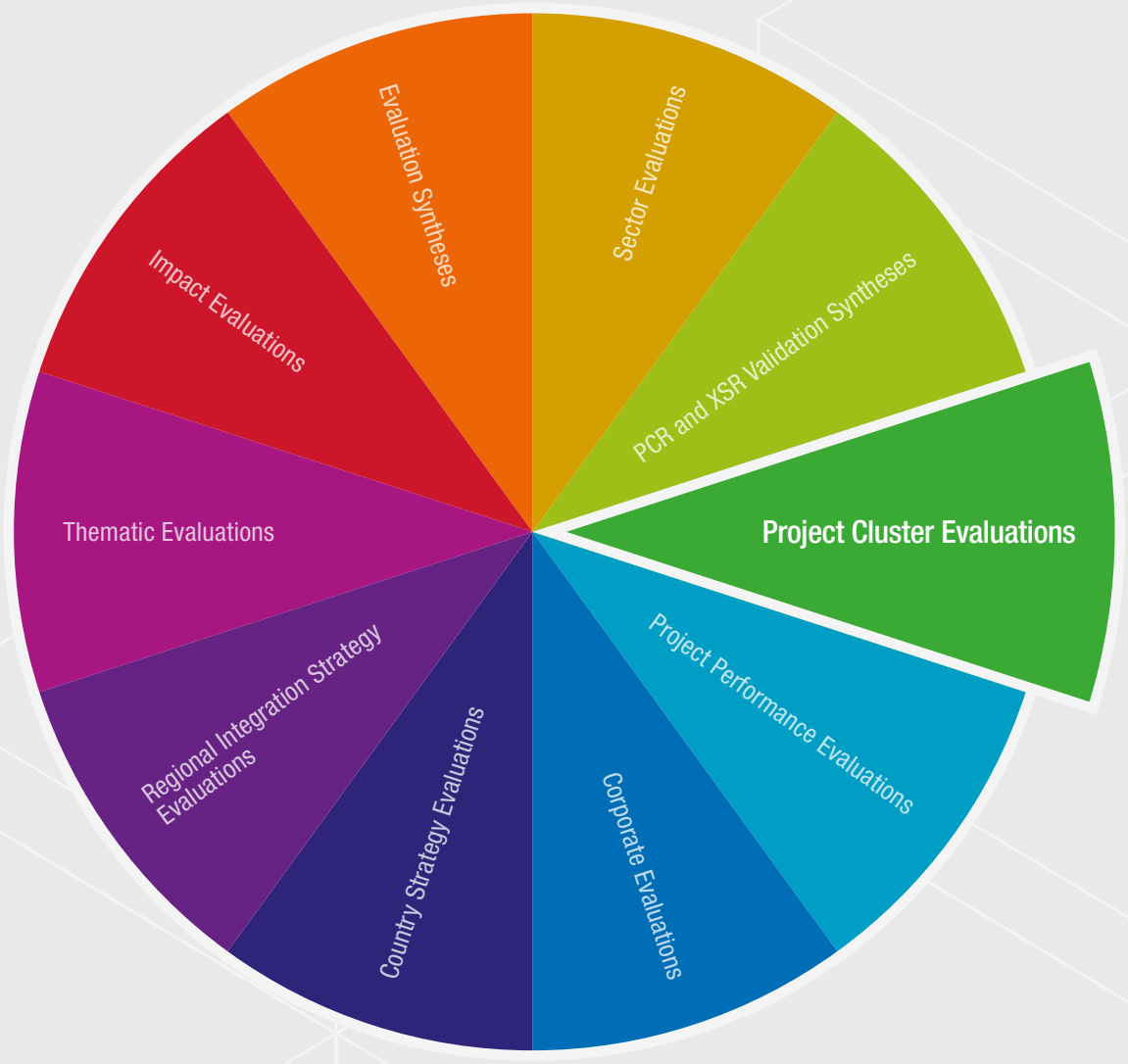

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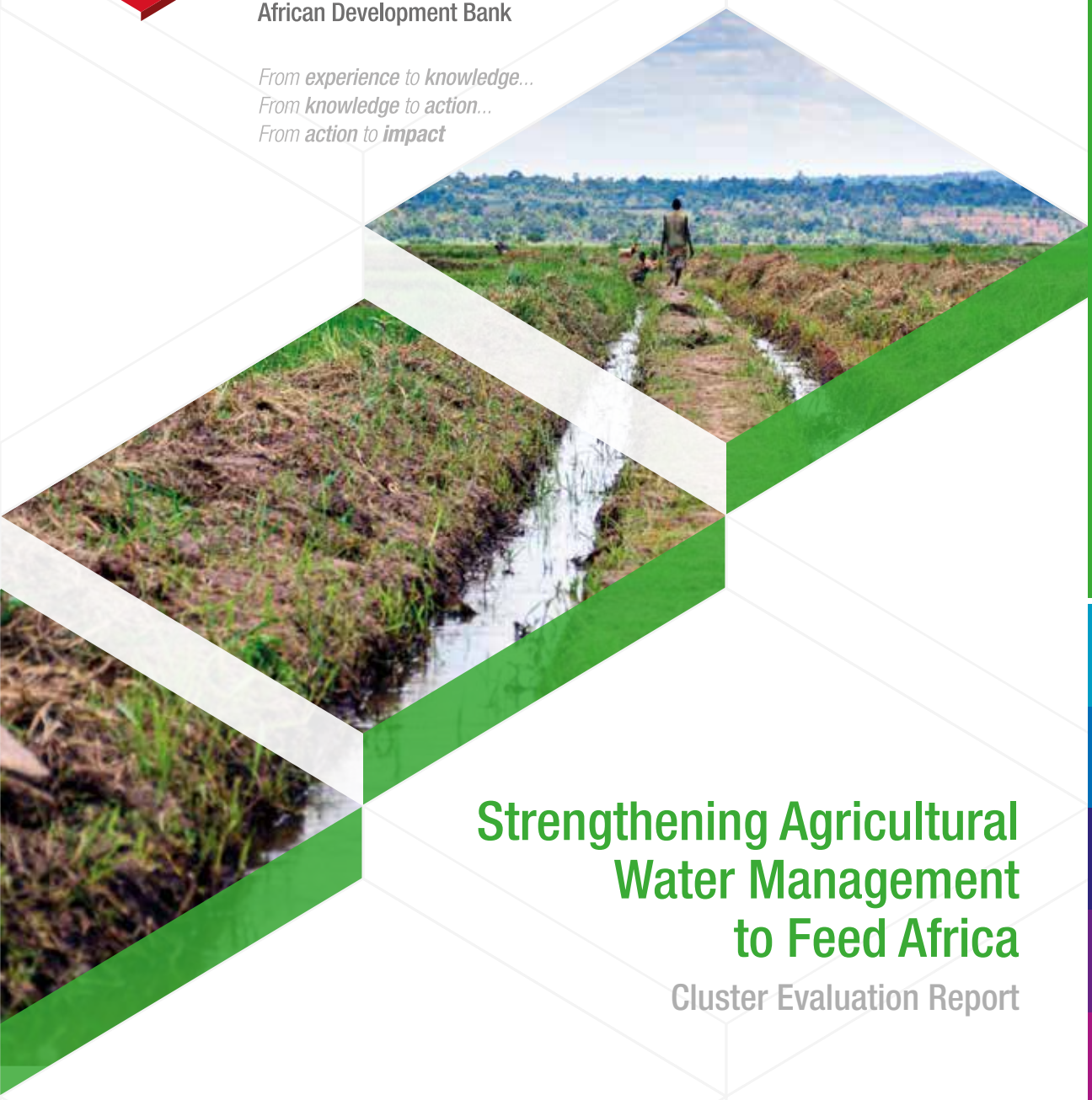

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Strengthening Agricultural Water Management to Feed Africa

Cluster Evaluation Report

AFRICAN DEVELOPMENT BANK GROUP

January 2020

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Strengthening Agricultural Water Management to Feed Africa
IDEV Project Cluster Evaluation, January 2020

About the AfDB

The overarching objective of the African Development Bank Group is to spur sustainable economic development and social progress in its regional member countries (RMCs), thus contributing to poverty reduction. The Bank Group achieves this objective by mobilizing and allocating resources for investment in RMCs and providing policy advice and technical assistance to support development efforts.

About Independent Development Evaluation (IDEV)

The mission of Independent Development Evaluation at the AfDB is to enhance the development effectiveness of the institution in its regional member countries through independent and instrumental evaluations and partnerships for sharing knowledge.

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Abbreviations and Acronyms

ADF	African Development Fund
ADP	Agricultural Development Programme
AfDB	African Development Bank
AWBP	Agricultural Water Business Plan
AWM	Agricultural Water Management
CSO	Civil Society Organization
EDM	Énergie du Mali (Mali energy company)
ESAP	Environmental and Social Assessment Procedures
ESA	Environmentally Sensitive Areas
FAO	Food and Agriculture Organization
FMRIP	Farmer-Managed Rice Irrigation Project-Gambia
GDP	Gross Domestic Product
IDEV	Independent Development Evaluation
IFAD	International Fund for Agricultural Development
IPTRID	International Program for Technology and Research in Irrigation and Drainage
IWMI	International Water Management Institute
KOSFIP	Kimira Oluch Smallholder Farm Improvement Project (Kenya)
LISP	Rwanda Livestock Infrastructure Support Program
MCC	Milk Collecting Centre
MDG	Millennium Development Goal
MTR	Mid-Term Review
NGO	Non-governmental Organization
PADAB	Bugesera Agricultural Development Support Project-Rwanda
PADERCA	Rural development support project in Casamance, Senegal
PER	Project Evaluation Report
PIPIB	Baguineda-Mali irrigation scheme intensification project
PIU	Project Implementation Unit
PPP	Public-Private Partnership
PPF	Project Preparation Facility
PRPIM	Manombo irrigation scheme rehabilitation project - Madagascar
RAB	Rwanda Agricultural Board
RLS	Revolving Loan Scheme
RMC	Regional Member Country
SDG	Sustainable Development Goal
SNPFS	Support to the National Program for Food Security-Nigeria
SWMU	Soil and Water Management Unit
UA	Unit of Account

Executive Summary

Evaluation Objectives and Methodology

This report synthesizes the results of the evaluations of nine Agricultural Water Management (AWM) projects that were approved and implemented by the African Development Bank Group (the Bank) in 2005-2016.

These nine AWM projects constitute a project cluster. The objectives of this project cluster evaluation were to a) measure Bank-financed AWM results from 2005 to 2016; b) analyze performance related to the management of those AWM interventions; and c) document lessons to improve the Bank's future AWM interventions within the context of the Bank's High 5s priorities, especially "Feed Africa". It will also contribute to the evaluation of the Bank's support to the water sector (2005-2016).

Over the period 2005-2016, the Bank approved 353 loans and grants in agriculture and rural development (amounting to UA 3.6 billion), 42% of which had AWM components.

The nine AWM projects for the cluster evaluation have a total net approval amount of UA 150 million. They were purposively selected for this evaluation, and are located in seven countries including The Gambia, Madagascar, Mali, Nigeria, Kenya, Rwanda, and Senegal.

The evaluation was based on a theory of change approach, and on quantitative and qualitative data drawn from multiple sources including desk review, project site visits and interviews with key stakeholders.

Project Cluster Performance

Relevance

AWM projects' objectives are relevant in terms of alignment to Bank and national water strategies, and to the needs of intended beneficiaries. However, relevance of project design is limited especially by weak results frameworks.

In terms of alignment, the AWM projects considered in the cluster analysis are relevant to the Bank's key policy and corporate objectives, the Millennium Development Goals (MDGs), the Sustainable Development Goals (SDGs) and the various national strategies of the Bank's Regional Member Countries (RMCs). The common theme across all these policies and strategies is a focus on poverty reduction, improved food security, and enhanced economic development. Based on a demand-driven approach, the project objectives reflect the needs of the intended beneficiaries.

However, the relevance of the project design was found to be limited, mainly due to weak project results frameworks. The quality of the project design was found to be inadequate. In most cases project design did not adequately take into consideration the water management issues and social dimensions of the beneficiaries. The inadequate skills mix of project teams limited the quality of project design. In addition, the weak quality of the studies that informed the project design led to underestimation of project costs and implementation periods. As a result, both project cost overruns and implementation delays were high. Furthermore, although the links between project activities and expected outcomes were established, they were not always clearly articulated. Unintended effects were also not captured.

Effectiveness

Although positive results were achieved, there was room for improving the output execution ratio and outcomes achievement. Multiple factors, including context, account for performance shortfalls.

The overall output execution ratio for all the projects was 68%. The highest AWM output delivery rate was around 80%, while the lowest delivery rate was about 51%.

In most cases, the focus was on the achievement of major civil works including main canal/intake, dam rehabilitation, etc. The outputs for minor civil works, secondary and tertiary canals, which were equally important to enable farmers' better and more efficient access to water supply, were not fully achieved (only 46%). Outputs such as feeder roads and accessible lines of credit that would have been useful for realizing the benefits of a value chain approach to agricultural water supply were under-delivered.

The AWM project cluster produced positive but moderate outcomes, typically improving access to water for domestic and farm use, but below expectations. None of the AWM projects reached its target of increasing access to water for agriculture. Only 35% of the AWM projects' target of smallholder farmers gained access to water for irrigation or livestock.

With regard to improved water management and access to markets, the AWM project cluster also achieved modest results. Only two projects had satisfactorily improved access to markets. Two other cluster projects had satisfactory water management outcomes.

The limited outcome achievement was mainly due to a) insufficient development of tertiary canals; b) limited irrigated/developed area; c) lack of complementary inputs such as fertilizer and improved seeds and plants; and d) inadequate capacity of water users' associations to manage the resources optimally.

Factors internal to the Bank that enabled or inhibited project development results were a) quality of preparatory studies; b) quality of project design; c) partnership during project implementation; and d) analytic capacity and management for development results.

Factors external to the Bank that enabled or inhibited project development results were government capacities in a) assessing needs; b) taking ownership and coordinating development aid; c) supporting participation of project beneficiaries and other stakeholders; and d) sustaining project benefits.

Efficiency

The AWM project cluster was efficient economically, though implementation delays were challenging.

The AWM project cluster was economically viable. Seven of the eight AWM projects were found to have achieved satisfactory results in terms of estimated economic internal rates of return in excess of their respective costs of capital.

The AWM project cluster was found to be inefficient in terms of timeliness (from approval to completion) of its output delivery. Only two of the nine AWM projects were rated satisfactory in regard to estimated delivery timeliness. Implementation delays between approval and completion were primarily due to changes in the project scope and budget, inadequate staff capacity, staff turnover, insufficient preparedness and procurement inefficiencies.

Sustainability

Overall, the AWM project benefits were somewhat likely to be sustained, notwithstanding the risks from the various weaknesses especially in project design, capacity building, institutional and political environment and governance, and economic and financial viability of the achievements.

Technical soundness was adequate. Overall, the project cluster countries had access to the right technology to sustain the infrastructures that were built in the project-areas. However, the projects' dependence on electricity to operate irrigation systems was costly and a threat to the sustainability

of project results. Another threat to sustainability was the challenge faced in maintaining project facilities.

Financial viability of the AWM project cluster was also challenging. Only four of the nine AWM projects established the means to ensure financial viability of the implemented infrastructure.

Weak capacity building, institutional and political environment, and governance, were found to be critical threats to the sustainability of project benefits. The AWM project cluster contributed to a) improving the capacity of public and private sector institutions; b) legalizing institutional/community associations; c) training project staff and beneficiaries; and d) developing water policies and laws.

However, unpredictable political contexts, weak beneficiary management and insufficient organizational capacities of beneficiaries weakened the sustainability of the projects.

Ownership and sustainability of partnerships was generally adequate. In fact, the projects promoted ownership by providing economic incentives for participation in project activities and allowing beneficiaries to manage their own project activities through their own institutional structures.

Projects further strengthened community ownership by integrating a broad stakeholder approach from project conceptualization to implementation. Involvement of local officials and the presence of a decentralization policy further contributed to building ownership.

However, project ownership was limited by insufficient mobilization of beneficiary contributions and development of relevant partnerships.

Inclusiveness

The evaluation found no evidence of the Bank's role in facilitating and engaging partnerships. Yet, project planning and implementation can positively influence project performance by explicitly and effectively involving relevant beneficiaries and the connections between them.

Although the project cluster used a participatory approach and satisfactorily mainstreamed gender, it was modest in effectively engaging stakeholders including the private sector.

Managing for development results

Managing for AWM development results was challenging, as the AWM monitoring and evaluation systems were inadequate. Although the AWM projects had monitoring and evaluation (M&E) systems, they were not fully operational, and were not used effectively. The M&E systems were specified in project documents, but they were hardly operational. They also lacked a comprehensive set of indicators, baselines and targets. Furthermore, the availability and accessibility of project data, especially at the outcome level, was limited.

Key issues and lessons

The nine AWM projects were implemented in different communities and under varied contexts. The evaluation has distilled five key lessons, which can guide the design and implementation of the Bank's AWM interventions in the context of the "Feed Africa" Strategy, and its long-term development of the agricultural sector in Africa.

Integrated project design and its subsequent adaptation during implementation matter in improving development results of AWM interventions

Lesson 1: AWM intervention design, based on an integrated framework that considers trade and market development changes and contexts (e.g., agricultural sector, agricultural water use, market actors), matters for the achievement of desired development results.

Ensuring more sustainable access to water in order to increase productivity and income requires a multidisciplinary approach that includes a) coordination between water, irrigation and agriculture actors; b) a value chain approach and market opportunities; c) access to credit; d) access to market infrastructures such as feeder roads; e) capacity development; as well as f) private sector engagement.

AWM interventions need to be supported by a robust and specific analysis, which is coherent with local contexts and integrates technical packages including soil, water, crop management, post-harvest training, and marketing aspects, including value addition for farmers. The analysis should also include identification of risks and assumptions, and remain flexible during project implementation.

Other issues around market linkages include effective forest conservation and the recognition that it cannot be realized in isolation. A comprehensive capacity building program and a sound marketing strategy should support the livelihood component.

Poor quality of the design of the AWM interventions not only affects project implementation but also undermines project development results. Finding win-win partnerships between farmers and private operators for an efficient use of available water is important in promoting value chains for value-added products.

Technical aspects and incentives are essential for ownership and sustainability

Lesson 2: Intervening in AWM requires looking not only at technical solutions but also at the incentive aspects that encourage participation and partnership with, among others, the private sector, the government and other development actors. Participation and partnership, if properly managed, can improve project quality, profitability, and ownership, and sustainability of development results.

Technology choices are important and should be relevant to beneficiary needs (i.e. multiple uses of water) and capacities, the physical characteristics of the intervention area, and the scale of the project.

Furthermore, the sustainability of AWM development results is not guaranteed without the right incentives for the beneficiaries to pursue the desired common goal; fair representation of water users; and decentralization of authority at the local level.

By providing economic incentives for participation in project activities that improve day-to-day livelihoods for the future, the AWM cluster projects created viable conditions for ownership.

Projects also promoted ownership by allowing beneficiaries to manage their own project activities through their institutional structures. This increased the likelihood that the project objectives would respond to community needs. In addition, the use of local services created stronger connections between the project beneficiaries and the service providers, which strengthened a sense of ownership.

Technical skills should include broad political, institutional and regulatory frameworks that the project strives to implement by creating and reinforcing groups that have interest and capacity to improve the system. Strong rural institutions, favorable policy environments and good institutional arrangements are key for delivering development results.

Without clear roles and responsibilities, conflicts of competency can emerge and undermine the ability of the water system to function efficiently.

Adequate skills, scope, and scale

Lesson 3: AWM projects require careful and realistic planning, design, and implementation that include adequacy of the scope in terms of time required, the skills needed for support, and the scale of activities to achieve the project objectives.

The skills, scope and scale of the AWM interventions need to be thoroughly analyzed prior to financing. Specific knowledge on the ground is critical for optimal water conveyance and resulting crop yields.

Timeliness in project start-up and the implementation of interventions is critical to avoid cost overruns; reduction in scope for some key activities; and the loss of an entire planting season for farmers. Particular attention should be given to the award of work contracts and the choice of hydro-agricultural development companies. In this area, delays can be detrimental due to a loss of off-season agricultural campaigns and subsequent reduction in farmer income. Successful contractors must be verified in terms of the actual availability of materials, qualified personnel and financial resources.

Ensuring accountability for efficient service delivery

Lesson 4: AWM interventions need to be accompanied by both a credible cost-recovery strategy, and governance improvements that ensure accountability for efficient service delivery by the service provider.

Adequate cost recovery and governance improvements are key for results-based AWM interventions. This is demonstrated through several AWM projects such as the ones below:

- Economic and financial viability for the Rwanda Livestock Infrastructure Support Program (LISP) is moderately unsatisfactory due to project beneficiaries facing issues which threaten economic and financial sustainability.
- In Mali, a series of issues led to the unsatisfactory cost-effectiveness of the project.
- In Rwanda (LISP and Bugesera Agricultural Development Support Project (PADAB)), the use of electricity in irrigation is considered costly and could threaten the sustainability of project results and budgets. There is also a lack of contribution from users.

Monitoring and evaluation for AWM project effectiveness and for capturing development learning.

Lesson 5: Quality and functional monitoring and evaluation systems are important tools for supporting project development effectiveness, and for capturing lessons to inform the replication and scaling-up of innovative solutions.

The review of the monitoring and evaluation systems of the AWM project cluster highlighted the importance of i) well-designed and functional monitoring and evaluation frameworks; ii) rigorous follow-up on AWM implementation plans; iii) regular outcome monitoring; and iv) establishing appropriate indicators for monitoring unintended effects, project exit strategies, and project sustainability.

Introduction

This report presents the results of a cluster evaluation of nine Agricultural Water Management (AWM) projects funded by the African Development Bank Group (the Bank). This project cluster evaluation mainly provides lessons learned from AWM interventions implemented by the Bank during the period 2005-2016, including projects approved since 2000 and for which independent evaluations were conducted. These lessons are meant to be used by the Bank and other stakeholders, including government, civil society and development agencies, in improving the design and implementation of AWM interventions. The evaluation assessed the AWM project performance mainly in terms of the Organization for Economic Co-operation and Development - Development Assistance Committee (OECD-DAC) criteria of relevance, effectiveness, efficiency and sustainability.

AWM Importance, Challenges and Opportunities

A review of a wide range of documents[1], including those of the Bank as well as other institutions, helped to define AWM, its challenges and opportunities.

Water management for agricultural purposes has been used across the world for at least 11,000 years, especially in North Africa, Latin America and Asia. Evidence of its use in sub-Saharan Africa is more recent particularly since the 1800s. This AWM practice aims at making water available and accessible for agricultural purposes through a combination of irrigation, drainage and flood control, water conservation and storage, on-farm water management, and institutional support to improve availability, sustainability, user operation and management. Recognizing the importance of AWM, the International Fund for Agricultural Development (IFAD) has highlighted reasons for investment in the sub-sector including a) intensification of production and improvement of crop yields; b) reduction in the risk of climate-related shocks; c) product diversification to improve market income and nutrition; d) increased water productivity and production efficiency; and e) renewal of natural resources and sequestering carbon (IFAD 2012).

Challenges in the AWM Sub-sector

The sub-sector's main challenges include the following:

a. Increasing water scarcity in some countries due to:

- Population growth. A continued explosion in the world's population will disproportionately affect Africa, raising concerns about further exacerbating existing water scarcity issues in some areas. It is estimated that 77% of the world's predicted population growth between 2015 and 2100 will occur in sub-Saharan Africa (UN World Population Prospects, 2017).

- Increasing competition for water from industrial development activities and human consumption. As economies grow, other industries use water for productive activities, diverting water away from use in the agricultural sector.

- Shifting food consumption preferences. As countries move through the stages of socio-economic development, most have also concurrently undergone what has been termed a 'nutrition transition', that involves a shift from a traditional,

staple crop-heavy diet toward a more 'middle income' diet that includes a higher proportion of nutrient-rich - but also water-intensive - foods such as meat, poultry, dairy and eggs.

b. Increasingly erratic climate patterns. Climate change is affecting rainfall patterns in many countries. In recent years, climate change has led to increases in extreme events such as droughts and floods. Climate shocks have the greatest impact on rain-fed food crops, which make up 90% of the staple food crops in sub-Saharan Africa. This vulnerability has prompted the development community to call for the implementation of increasingly resilient water management approaches.

c. Inefficient use of water resources. Inefficiencies in water usage are much higher in sub-Saharan Africa than in other regions of the world. There is scarcity in certain areas, but the main problem is failure to make efficient and equitable use of the available water. Huge volumes of rainwater are lost or never used, particularly in the rain-fed regions of sub-Saharan Africa (CPWF[2], CGIAR[3], 2011).

d. Irreversibility of AWM interventions. After AWM interventions, some irreversible changes may occur in the area of intervention that can affect land tenure patterns, topography, soils levelling, and even beneficiaries.

Opportunities in the AWM Sub-sector

The main opportunities for enhancing the effectiveness and efficiency of the AWM sub-sector include the following:

a. Advances in technology and management for increased water efficiency. There are several other potential avenues through which to increase the efficiency of water resource use rather than exploiting new water resources. These include:

- Advances in irrigation technology. Drip irrigation, for example, can double water productivity as measured in crop yield per unit of water. However, this technology has a high capital cost and its acceptability and potential for wide-scale adoption have not been adequately demonstrated.
- Changing crop varieties.
- Adoption of different water management techniques based on water pricing.

b. Contextual awareness in policies and interventions. Increasing recognition of the need to base AWM interventions on the needs and contexts of farmers, underpinned by comprehensive assessments of the biophysical and socio-economic contexts in which they live and work, reduces the chances of repeatedly implementing "one size fits all" approaches that are ill-suited to the context. More work needs to be done in developing models for planning AWM investments according to the diversity and complexity of country and location contexts.

c. Synergistic sustainability outcomes with other natural resources. Investing in AWM has the potential to rehabilitate ecosystems and landscapes.

d. Increasing emphasis on learning from experiences, including failure. A number of location and technology-specific manuals or guides are available, but there is no comprehensive repository of knowledge for decision-makers.

e. Small-scale irrigation. This approach has shown promise in developing countries as a means of promoting rural food security.

The Bank's Approach and Support to Agricultural Water Management

The agriculture and rural development sector has been a priority for the Bank in supporting livelihoods and food security. Although the Bank has never had a dedicated policy for agricultural water management, it has prepared an Agricultural Water Business Plan (AWBP), within the context of the African Water Vision[4] 2025 and Comprehensive Africa Agriculture Development Program or CAADP-Pillar I (Sustainable Land and Water Management), and the African Food Crisis Response (AFCR - July 2008). The AWBP aims to develop an area of up to 500,000 hectares under improved AWM through a) agricultural water development; b) increased water storage capacity; and c) institutional support and project preparation activities. This AWBP also aims to increase the water storage capacity of Africa by at least 1% comprising of additional storage of 8.5 billion cubic meters for multi-purpose uses, including irrigation, domestic use, livestock watering, and fisheries.

According to the Feed Africa Strategy (2016-2025)[5], the implementation of AWM and water storage projects have helped to increase agricultural productivity through crop intensification and support to farm households in the targeted countries in order to ensure the productive use of irrigation systems and/or multiple water use. The total approved financial resources in support of implementation of the AWBP were UA 924.31 million, with a shortfall of 47% compared to the global target amount. As a result of the reduced financial allocation to the AWBP, the total agricultural water management area and water storage targets were not fully achieved. Bank support was for less than 30% of the global target hectares.

The ultimate goal of the Bank's interventions in AWM is to reduce poverty and enhance socio-economic development through increased and sustainable agricultural productivity, increased rural revenues, and enhanced food security. The Bank's reconstructed theory of change for AWM development is presented in Annex 1.

The Bank had approved 1410 operations in the agriculture and rural development sector during the period 1968-2016. This portfolio of approvals represents approximately a total of UA 11.9 billion, representing 3% of the overall Bank approvals in the same period.

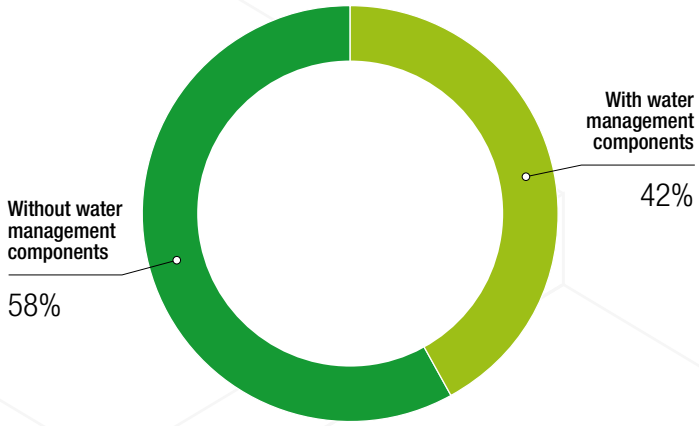
During the review period (2005-2016), the Bank approved 353 loans and grants in the agriculture and rural development sector amounting to about UA 3.6 billion. This accounted for about 4% of the Bank's overall approvals during the same period[6]. As indicated in Figure 1 below, 42% of these operations had AWM components, which mainly included drilling of boreholes, construction of water control schemes, watershed management, and irrigation and drainage.

In terms of financing mechanisms used, the African Development Fund (ADF) was the predominant window with almost 60 % of the budget committed to completed AWM projects over the period. This was followed by the African Development Bank window with around 25%, the Global Agriculture Food Security Program (GAFSP) Trust Fund[7] with almost 10% and other financial instruments such as the Middle Income Country Technical Assistance Fund (MIC-TAF), Nigeria Trust Fund (NTF), African Water Facility (AWF), Special Relief Funds (SRF), etc., each representing less than 5% of the total budget.

Evaluation Purpose, Objectives and Scope

The main purpose of this evaluation was to provide the Bank's operations management and staff, and other stakeholders with relevant lessons to inform design and implementation of the Bank's support to AWM within the context of the Feed Africa strategy. It was also meant to provide the Bank's Board of Directors and Management with evidence on the performance of AWM projects.

Figure 1: AfDB-funded Agriculture Operations, FY05–FY16 (%)



The specific objectives of the evaluation were to: a) assess the results of the Bank-financed AWM projects in terms of relevance, effectiveness, sustainability, efficiency, knowledge and advisory services in 2005-2016; b) analyze performance in the management of the AWM interventions in terms of quality of design, partnership, results-based management, factors enabling or hindering results; and c) identify lessons to inform the Bank's design and management of AWM interventions.

The evaluation covered a cluster of nine AWM projects amounting to net loans of UA150 million in seven countries including Madagascar, Kenya, Mali, Senegal, Gambia, Rwanda and Nigeria (see Annex 2). These projects have been completed. The evaluation mainly focused on the AWM project performance in terms of the OECD-DAC criteria of relevance, effectiveness, efficiency and sustainability.

Evaluation Approach, Methods and Limitations

The evaluation used a theory-based approach. The evaluation team reconstructed the theory of change of the AWM project cluster indicating intervention activities, outputs, outcomes and associated assumptions (see Annex 1). This provided the basis for assessing the results for both individual project and cluster levels.

The evaluation focused on a cluster of nine AWM projects approved and implemented by the Bank between 2005 and 2016 (see the section on evaluation purpose, objectives and scope), using appropriate performance indicators for the assessment.

Both quantitative and qualitative data on AWM performance and context were generated mainly from desk review of documents, surveys, key stakeholder interviews (within and outside the Bank), and site visits (including direct observation). The project sites that were visited and interviewees were purposively selected based on geographical representation and accessibility. Each category of data was analyzed using mainly descriptive statistics. Comparative analysis was also done at indicator levels using baselines, targets and actual results. A stakeholder feedback workshop was held in each of the seven countries that were visited in order to validate the

collected data. Quality control was achieved through internal and external peer reviewers.

This evaluation faced several challenges, which were mitigated by the use of multiple lines of evidence from mixed sources. The challenges included i) lack of a Bank-wide coding system to clearly identify AWM projects (the identification was done manually and some projects may have been missed); ii) scarcity of readily available performance data. The available data was not accessible through a centralized reporting system; and iii) inadequate budget resources to visit a sufficiently representative sample of project sites owing to the very wide geographical spread of some of the projects.

Project Cluster Performance

Relevance

AWM project objectives were found to be relevant in terms of alignment to the Bank's and the RMCs' water strategies. Based on the demand-driven approach, the project objectives were also relevant to the needs of the intended beneficiaries. However, the relevance of project design was limited, especially by weak results frameworks.

The objectives of the AWM project cluster were consistent with the relevant Bank and RMC strategies. As depicted in Annex 1, the AWM projects cluster mainly aimed at improved market access, farm productivity, water supply and management in order to increase household farm income and food supply.

During the period under review, the Bank's involvement in AWM was based on a few key policy and corporate documents including the 2000 Agriculture and Rural Development Policy (2000 ARDP), 2010 Policy for Integrated Water Resources Management (2010 PIWRM), Country Strategy Papers, and the Feed Africa Strategy 2016-2025. The main objective of the Bank's 2000 ARDP is to "identify major constraints that limit economic growth in the agricultural sector and the rural economy and focus attention on specific areas where the Bank can develop comparative advantage for future leadership". The key objective of the 2010 PIWRM is "to improve access to safe water as a means to poverty reduction and socio-economic development in RMCs". The Bank's Feed Africa Strategy aims to transform African agriculture into a competitive and inclusive agribusiness sector that creates wealth, improves lives and secures the environment.

The AWM project cluster objectives were also relevant to the MDG Goal 1 (eradicate poverty and hunger) and Goal 7 (ensure environmental sustainability), and to the SDG Goal 1 (end poverty in all its forms everywhere), and Goal 15 (sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss).

In addition, the AWM project objectives were consistent with the RMCs' national, sector and regional strategies (specific to agriculture or natural resources) of reducing poverty, improving food security, and economic development. They address part of the key development challenges in the involved RMCs. These strategies include participatory approaches underpinning the AWM project cluster especially in four of the nine projects including Kenya Green Zones, Gambia, Madagascar, and Mali.

In terms of the relevance of design, the AWM projects cluster was challenged by substantial shortcomings. Although all of the nine projects in the cluster had clear development objectives, these objectives were not adequately matched by the levels of activities/outputs proposed in five of the nine projects. Furthermore, the majority of the projects in the project cluster failed to identify and consider key risks and unintended consequences including output use conflicts.

The relevance of design for four of the nine projects in the cluster was overall satisfactory. The Gambia Farmer-Managed Rice Irrigation Project (FMRIP) is an exemplar of this set of projects. In the Gambia FMRIP project, activities and outputs related to infrastructure, as described in the project's logical framework, were realistic, clear and consistent. The project had a clear and realistic intervention strategy and approach including community participation and empowerment, demand-driven and integrated value chain development, infrastructural development, and capacity building. It adequately mainstreamed cross-cutting issues such as gender, youth and the environment. The Gambia project's design benefitted from the experiences of

other past Bank operations in the Gambia particularly the Multi Nerica Rice Development Project (MNRDP, 2004-2011), the Lowland Agricultural Development Project (LADEP, 1997-2004), the Rice Development Project (RIDEP), and the Jahally Pacharr Smallholder Improvement Project (JPSP, 1982-1993).

But the relevance of design of five of the nine projects in the cluster was less than satisfactory. The Madagascar *Projet de réhabilitation du périmètre irrigue de Manombo* (PRPIM) is one of the projects with the most weaknesses in the relevance of design. Its relevance of design is negatively affected by:

- The unrealistic assumption of adequate and financial technical capacities of the project beneficiaries to build the secondary network of water canals.
- Risks associated with multiple users of water access points.
- The proposed hydraulic structures (including dissipation basin, main canals), and watershed that are not adequately fit for achieving the desired project objectives. This deficiency is mainly linked to the poor quality of the project feasibility study. The stakeholder interviews also identified the low quality of project feasibility studies as a serious and recurring problem in Madagascar.
- Potential of unintended negative consequences including output use conflicts resulting from the combined effects of i) downward rationalization of the number of water points (from 140 to 45); ii) presence of multiple users; iii) organizational management change of water access points; iv) disregard of community participation in water access points management; v) unclear ownership rights over water access points; and vi) lack of appropriate incentives for water access point management and use.

Effectiveness

Although positive results were achieved, there was room for improving the output execution ratio and outcomes achievement. Multiple factors including context account for this performance of the AWM project cluster.

AWM Outputs Achieved

The AWM interventions achieved moderate outputs. The overall project cluster delivered 68% of the target outputs. The highest AWM output delivery rate was about 80% for the Gambia FMRIP, Kenya Green Zones and Rwanda PADAB projects, while the lowest delivery rate was about 51% for the Madagascar PRPIM and Kenya Kimira Oluch Smallholder Farm Improvement Project (KOSFIP).

The main physical outputs of the AWM project cluster were land development (irrigation schemes,[8] drainage and flood control, and water conservation and storage facilities); and ii) rural infrastructure including social structures and facilities to enhance producer well-being.[9] The essential storage and irrigation canal facilities were supplemented with credit, marketing, transport, fertilizer, seed supply and similar services to enhance farm productivity and production. The AWM project cluster mainly used three irrigation and drainage technologies including i) gravity-fed irrigation technology (Kenya KOSFIP and Rwanda LISP); ii) tidal irrigation (Gambia); and iii) electricity-powered technology (Rwanda PADAB). None of the AWM project cluster used solar-powered irrigation systems.

However, the overall AWM output level was adversely affected by incomplete land development such that only 46% of the target was achieved. For example, in Madagascar and Kenya KOSFIP, the major civil works (main canal/intake, dam rehabilitation, etc.) were constructed, but the secondary and tertiary canals, which were necessary for better and more efficient access to water by farmers were incomplete. In the case of Rwanda LISP, only one of the 72 livestock watering systems planned for the Eastern Province site was fully developed and operationalized in Nyagatare District.[10] The focus group discussions revealed that on the Kenya KOSFIP, most sections of the project's tertiary canals were incomplete and not connected to water due to delays in paying contractors. The AWM Nigeria project failed to deliver the rural market

structure, one of the critical pathway components for the achievement of the project development objectives.

Additional limits to the delivery of the AWM outputs were i) financial constraints (Kenya KOSFIP,[11] and Madagascar); and ii) changes in technology choices and site selection to address design shortcomings (Gambia, Rwanda PADAB, Madagascar, and Nigeria). Furthermore, corrective actions to address implementation weaknesses were not always timely and their implementation was not always compliant with good quality delivery standards.

AWM Outcomes Achieved

The AWM project cluster produced positive but moderate outcomes. The AWM project cluster improved access to water for domestic and farm use, with the exception of Nigeria[12] and the Kenya Green Zones[13], but the improvements were below expectations. Projects resulted in reduced drudgery of fetching water for both domestic and farm uses, and an increase in protected and developed land for agricultural activities (see Annex 3, Table A3.1). However, none of the AWM projects reached its target to increase access to water for agriculture. Only 35% of the AWM projects' targeted smallholder farmers gained access to water for irrigation or livestock. Only Mali registered good results with the irrigated hectares accounting for 66% of the overall target.

The AWM project cluster also reported limited increase in agricultural production and productivity. This conclusion is similar to that of previous AfDB evaluations including AfDB 2011a and AfDB 2013a p15. All AWM projects increased agricultural production and productivity in terms of agricultural crop diversification, which were also associated with increased income generation among project beneficiaries. However, these improvements in crop production and productivity fell short of the pre-determined targets.

In terms of improved water management and access to markets, the AWM project cluster achieved modest results. Only two projects had satisfactorily improved access to markets including Kenya Kimira Oluch and Rwanda LISP projects. Two other projects of the AWM cluster also had satisfactory water management outcomes.

The Kenya Green Zones was one of the AWM projects that registered notable **positive water resource management and environmental conservation results.** It was a good example of using reforestation to mitigate the negative impact of climate change (Box 1). The project contributed to reduced forest degradation and increased afforestation, enhanced community participation, strengthened community ownership, and enhanced livelihoods. However, the foreseen increase in fruit tree plantation was not realized. Tree plantation was common in the Kenya KOSFIP, Mali, Nigeria, Rwanda PADAB and Senegal projects.

The AWM project cluster outcomes were mainly limited by:

- The moderate level of AWM outputs including insufficient development of irrigation tertiary canals, limited irrigated/developed farm areas, and inadequate complementary inputs such as fertilizer and improved seed and plant;

Box 1: Kenya Green Zones Project - A Sustainable Strategy of Mitigating the Negative Impact of Climate Change on Water Availability

The Kenya Green Zones Project sought to promote the conservation of water towers, either directly through forest rehabilitation and participatory forest management, or indirectly through promoting alternative livelihoods that would reduce overreliance on forest-based activities.

The project has led to an increase in forest cover in the five water towers (target areas). Forest regeneration is evident in the Sururu/Likia and Logoman forest blocks of Mau, Gathioro, Kabaru, Kakamega, Penon and Njukiri forests. While there was no indicator to measure water resource conservation through forest regeneration, direct observation in the field found evidence of the recharging of the water. For instance, the Kathithi catchment area had previously dried up but now has more water, allowing it to be used for micro irrigation.

Source: Kenya AWM PERs and field visit

- Inadequate capacity of water users' associations (WUAs) to optimally manage water for irrigation. This was mainly due to i) lack of a proper financial base to effectively engage in the basic operation and management of the scheme (Kenya KOSFIP, Rwanda PADEB,[14] Gambia and Senegal); and ii) disorganized and inefficient WUAs (Madagascar, and Rwanda LISP) and farmers' associations (The Gambia). In the Gambia, for instance, the Rice Farmer Cooperative Society (RFCS), which was the main conduit of services to farmers, was not effective and efficient in managing the service charges (land preparation, milling) and the revolving loans.[15] For Rwanda LISP, the failure of the WUA to maintain and repair the water infrastructure led the Ministry of Agriculture to hand over the management of the infrastructure to Nyagatare District and the Water and Sanitation Corporation. In addition, poor service provision and the lack of effective management led some farmers to take irrigation matters into their own hands in order to increase and better control their water supplies such as was the case in Madagascar, Kenya KOSFIP and Gambia. For example, in Madagascar, a new water management organization emerged that destabilized the system to the point that users were claiming ownership of, and demanding quotas for access to water points. This was contrary to the project's strategy of achieving the intended outcome of improving access to water.

Factors Enabling Results

Multiple enabling factors were associated with the AWM project cluster positive results (Annex 4) including the following:

- **Government ownership and commitment:** These matter especially in providing i) the supportive macro-policy and political environment for project implementation; ii) appropriate and effective mechanisms for the participation of beneficiaries and other stakeholders, and inter-sectoral coordination; and iii) appropriate and timely counterpart funding. The government role was also important in ensuring the integration of existing local structures and local realities in the AWM project design and implementation.

- **Appropriate and effective Bank support:** The Bank services were important for the quality at entry and effective supervision of the AWM projects. Stakeholders frequently cited the project design as a key determinant of project success. The Bank supported the timely delivery of appropriate feasibility/technical studies to ensure the quality of the AWM projects. AWM projects that benefited from effective Bank supervision registered successful outcomes. In addition to the annual supervisory services, the Bank supported mid-term reviews that were essential in informing quality project implementation.

- **Effective community ownership and participation matter for positive results:**[16] Five of the nine projects used a community-based approach in order to promote community ownership. In this regard, the projects used community-based associations/networks, which enabled the beneficiaries to participate in planning and implementation activities. The projects used these community-based associations and local firms for the provision of services to beneficiaries. This helped not only in building community ownership but also in ensuring that the target beneficiaries received the project services and products.

- **Good communication and coordination between central and regional levels produced. Positive AWM project results.** This was evident in three of the nine projects. Effective coordination between the local implementing unit of the project and the executing agency contributed to the timeliness of project procurement, disbursement and other project activities and services.

- **Effective partnership with other stakeholders:** In the Gambia, the use of local firms to provide contractual services was found to have facilitated project achievements by building community ownership.

Factors Hindering Results

Deficiencies in the above enablers contributed to the unsatisfactory project performance. These deficiencies include:

- Unsatisfactory project design, evident in missing activities in some of the project designs.
- Delays in and inadequate delivery of Bank services.
- Unsatisfactory quality and delivery delays of project activities and facilities/outputs.
- Deteriorating macro-environment (e.g. Mali) and political context (e.g. The Gambia).
- Weak project coordination partly due to unstable management including high staff turnover and lack of appropriate experts, especially gender experts.

Unintended Impacts

The AWM project cluster also generated both positive and negative unintended effects. The positive effects include farmers' introduction and use of hand pumps for drawing water thereby resulting in additional acreage of irrigation, and increased farm production and incomes. In the case of the negative unintended effects, they mainly include community conflicts between beneficiary community and non-beneficiary community in close proximity to the water source and between crop farmers and herders. The increased use of pesticides in rice production was also likely to generate harmful effects.

Efficiency

The AWM project cluster was economically viable, but implementation delays were challenging.

Viable economic performance. Overall, the AWM project cluster was found to be economically viable. Seven of the eight AWM projects had satisfactory estimated economic internal rates of returns, in excess of their respective costs of capital (Annex 3, Table A3.2).

Substantial implementation delays. The AWF project cluster did not follow their implementation timetable, except Mali, Ghana, and Rwanda Bugesera projects. As Table A3.3 in Annex 3 shows, the average project implementation period (from approval to completion) was 90 months (7 years and 6 months), which translates to an average delay of 23 months relative to the planned duration at appraisal. The implementation duration ranged from a minimum of 71 months (around 6 years) in Mali, to 119 months (around 10 years) for Kenya Kimira Oluch.

These delays were primarily due to significant changes in the project scope and budget (e.g. for Kenya Kimira Oluch), inadequate staff capacity, high staff turnover, insufficient preparedness (e.g. for Gambia FMRIP and Nigeria SNPFE), and deficiencies in procurement processes (e.g. for Kenya Green zones and Senegal PADERCA).

Sustainability

Overall, the AWM project benefits were somewhat likely to be sustained notwithstanding the risks related to the various weaknesses especially in project design, capacity building, institutional and political environment and governance, and economic and financial viability of the achievements.

Technical Soundness

Technical sustainability of the AWM project cluster was likely to be achieved. The project technologies were appropriate for the beneficiaries and respective contexts notwithstanding the challenges of maintaining sustainable access to spare parts. For example, technologies selected for the Senegal PADERCA were well-aligned with the needs of the beneficiaries. The Gambia FMRIP relied on relatively cheap renewable

energy (i.e. wave capture) instead of fossil fuels. In Rwanda, both the livestock water systems and milk collection centers were based on simple technologies that could be managed by local farmers. However, the use of electricity in irrigation was considered costly, which could threaten the sustainability of project results. Maintaining ready access to spare parts remains a threat to sustaining the AWM project benefits especially in the Gambia and Nigeria projects.

Capacity Building, Institutional and Political Environment and Governance

Government commitment was high, and it included technical capacity as well as appropriate water policies and laws in support of the continuity of project benefits. There were also some levels of technical and community capacities (through associations) for maintaining the AWM infrastructures. However, a number of aspects posed substantial threats to the sustainability of the project benefits. These threats were mainly related to the weak country systems and capacities, social infrastructures and institutions, financial resources, and private sector participation. Unpredictable political context was also another threat to sustaining AWM infrastructure.

Financial Viability

Financial viability of the AWM project cluster was also challenging. Only four of the nine AWM projects including Kenya KOSFIP, Kenya Green Zones, Nigeria and Rwanda PADAB established mechanisms to ensure financial viability of the implemented infrastructure. For example, the Rwanda PADAB had technical and financial capacity to sustain its gravity feed system. Its cost recovery, through the water fees, was effective.

For the five other AWM projects, financial viability was a concern. There was no clearly defined exit strategy to ensure that farmers and farmers' groups could gradually stand on their own after project completion. In Nigeria, farmers' groups were charging membership and user fees for all group facilities. But there were outstanding unpaid loans. In the Gambia, financial management by the farmers' cooperative society was not effective, and the services could not be continued. In Madagascar, financial independence was poorly planned, and users refused to pay user fees. In Senegal, the revenue generated was insufficient for the full maintenance of facilities, as local collections were not managed effectively and there was lack of users' contributions.

Ownership and Sustainability of Partnerships

Project ownership was favorable in five of the nine AWM projects including Kenya Green Zones, Madagascar, Nigeria, Rwanda LISP, and Rwanda PADAB. By providing economic incentives for participation in project activities, which improved day-to-day livelihood, and promise for the future, the project created conditions for ownership such as in the case of Kenya Green Zones. This was also demonstrated in Nigeria, where farmers led project implementation.

The AWM projects also promoted ownership by allowing beneficiaries to manage their own project activities through their own institutional structures such as for Kenya Green Zones. In Madagascar and Rwanda, beneficiaries and local officials were involved in the design and the implementation of the project either directly, or through their representative organizations and associations. As a result, the AWM projects reflected community needs. In addition, the use of local services created stronger connections between beneficiaries and service providers, which reinforced sense of ownership.

The AWM projects also supported community ownership by integrating a broad stakeholder approach during project conceptualization and implementation such as for the Kenya Green Zones. A decentralization policy also helped to build ownership. This was the case in the Rwanda projects, which were effective at involving both national and local stakeholders. The two projects promoted a sense of ownership amongst the beneficiaries including farmers and local officials at the district and sector levels.

However, project ownership was limited in the case of the Mali and Senegal projects. In both cases,

the beneficiaries were not sufficiently mobilized for partnership and project ownership.

Inclusiveness

Project performance can positively be influenced when project planning and implementation explicitly consider the inclusion of, and connections between, relevant stakeholders including the beneficiaries.

The AWM project beneficiaries include farmers or water groups, cooperatives or associations, local, regional or district governing bodies, inter-ministerial steering committee or coordinating unit, line ministries and the private sector.

Government was committed to all the nine AWM projects. Stakeholder collaboration was mostly made possible through capacity building, accountability and the provision of essential services, including financial and technical expertise and resources. When an operational network of essential stakeholders was already present in the RMC prior to implementation, the project benefited from building upon this existing structure.

Participatory Approach

The AWM project cluster highlighted the importance of including stakeholders early in the project planning, as stakeholders were more likely to contribute to the realization of outputs especially when they were convinced that activities were appropriate. However, the roles and responsibilities of the various project stakeholders and their relationships to one another were often not addressed in planning documents for instance in the case of Rwanda PADAB.

Several successful cases where planning included stakeholder identification and connectivity, were found among the projects. For example, in Rwanda, the LISP project evolved in a decentralized system and attributed explicit roles and responsibilities to local officials. This strengthened the project partnership network of local actors as a result of their involvement in project planning and implementation. The PADERCA project in Senegal established mechanisms for mobilization and partnerships development, including a participative approach and involvement of local cooperatives and producer organizations. In this case, the State provided services and managed supervision to reinforce capacities of the project's technical services.

The importance of establishing a formal framework to identify key stakeholders as well as their roles and responsibilities was further illustrated by the PRPIM in Madagascar. The project was to be implemented in a context where institutional structures or strategic plans for partnerships were absent. In addressing this deficiency, a consulting firm was recruited to provide a stakeholder coordination framework in which the roles and responsibilities of the various stakeholders were defined.

Most often, projects built partnerships with central governments through the formation of steering committees. Steering committees facilitated inter-ministerial coordination and were seen to be particularly effective when institutional structures or strategic plans provided clear guidance for project implementation. For example, in the Green Zone project in Kenya, the Participatory Forest Management Plan - managed at the ministerial level - legitimized the role community-based farmer groups played in forest management by according them legal status to create and implement these plans. Connections would have been further strengthened between the ministry and community associations through the provision of technical support from the line ministries to the beneficiary groups. However, the project did not fully achieve this objective. The Kenya Kimira Oluch project also adapted a participatory approach with the integration of line ministries for maintenance, operation and technical services. Farmer representatives were included in the project steering committee, the highest policy-making body of the project. The local government offered extension services to the water users' association leadership. These associations were led by project beneficiaries.

Public-Private Partnerships (PPPs)

The AWM project cluster evaluation acknowledged the importance of private sector engagement in the nine AWM assessed projects that were assessed

for this evaluation. In Madagascar, a consulting firm identified the need to include private partners through a law that would guide the operations of all the AWM projects. The strength of the PPP varied within and across the AWM projects, and the analysis identified the need for improving private sector performance. Indeed, careful selection of private entities and an investment in capacity building often influenced private sector contributions and PPP success.

In The Gambia, PPPs were strengthened during project implementation by adapting procurement procedures that enabled local firms to develop land and establish partnerships between the rice farmer cooperation and private facilities and equipment suppliers. In Nigeria, private sector partnerships with farmer groups were strengthened throughout the project. However, connections to equipment suppliers remained weak, suggesting PPPs were inadequately developed. In Rwanda, although the poor operation of PPPs discouraged development partners, the LISP project aimed to strengthen PPPs by providing training, capacity building and management support to local beneficiaries, private firms and public offices. In the case of the Rwanda PADAB project, both the Ministry of Agriculture and the water users' association established a network of stakeholders, which included both private and public entities. However, the partnership between the private sector and farmer cooperatives needed some strengthening. In Mali, a firm with inadequate competencies was selected as the private partner.

The farmers, water groups, cooperatives or associations played a key intermediary role in project performance. The potential for the project to achieve community ownership was often attributed to the efficient functioning of these groups. These groups were also frequently entrusted with the responsibility of implementing project activities. A poorly managed and financed entity could have detrimental effect on project performance when there was a suboptimal transfer of funds from the state to the management organizations. One key feature of their efficiency was the presence of an appropriate financial partner. Another essential condition was reliable funding from the responsible ministry.

In Nigeria, weak partnership between the farmers group and a financial institution was a missed opportunity to improve fiscal management and to manage microfinance or commercial bank loans. Need to strengthen partnerships between savings and credit cooperatives, and farmer-based cooperatives was evident in the Rwanda PADAB project, with an emphasis on selection of the appropriate financial partner to advance agribusiness.

The capacity of farmers, water groups, cooperatives or associations to efficiently represent their beneficiaries was determined by the nature of their partnership with ministries and local government. In Madagascar, the distancing of the State from the project during its execution was meant to reinforce the partnerships between the entities that represented beneficiaries and the beneficiaries themselves. Similarly, in Nigeria, the non-political intervention was to allow for the independent selection of communities in line with the aims of the project. In The Gambia, there was some indication that the partnership between the government and the project was undesirable as the project faced political interference at both the national and Rice Farmer Cooperative Society levels.

NGOs typically collaborated with line ministries to provide training and capacity building. However, the mobilization of NGOs and CSOs for project planning and implementation was inadequate, for instance in Kenya. In Nigeria, a committee responsible for the management of service delivery to farmers collaborated with NGOs to train their members. Partnership with these NGOs were extended to include training for an Agricultural Development Program (ADP) and local government councils to enable them to perform their project coordination roles more effectively.

Apart from the NGOs and CSOs, mobilization of key partners was generally insufficient. The consequences of excluding key partners was demonstrated in Nigeria, where the exclusion of the ADP and the absence of farmer leaders during project planning resulted in inefficient program implementation. In Mali, the limited mobilization of the beneficiaries resulted in limited key outcomes

and unintended negative consequences. However, in Rwanda PADAB, beneficiaries became active partners in the project through training. Therefore, they were able to assume some active roles as facilitators. Nonetheless, the capacity of the beneficiaries of the PADAB project to implement certain project components was inadequate.

Gender

Gender mainstreaming was found to be satisfactory, as all of the nine AWM projects addressed issues of gender in the design and outcome measurement. Several projects included women's interests through stakeholders' participation during the planning and implementation of the project. Data that was collected through household surveys included women in individual interviews and focus groups. Women were thus represented to at least some extent in outcome measures across all projects. However, not all projects included measures specific to women. When measured, results demonstrated that projects had favorable outcomes specific to women.

Several projects included women in a decision-making role. For example, in the Gambia FMRIP, the National Women Farmers' Association was a stakeholder in project planning. This project also provided evidence for women's involvement in project design, which was noted to be equal to men, with respect to both passive and active participation. In Kenya Green Zone, women were represented through the Community Farmers Association, which is the legal and authoritative entity that managed the project. The Kimira Oluch project in Kenya was designed in a participatory manner involving local stakeholders including youth, women and vulnerable groups.

Outcomes usually included women but were not always specific to women. For example, results included measures for both women and men in terms of training, participation in group activities, future employment, business perspectives, skills, household income and job creation.

Some projects, however, did not achieve the anticipated benefits for women. For example, in Mali, the project did not increase women's access to irrigated land and did not create learning centers. Benefits to women from some other projects were unclear, such as in Madagascar, where achievements with regard to revenue generation and access to microcredit were not gender-specific.

Managing for Development Results

Managing for AWM development results was challenging, as the AWM monitoring and evaluation systems were deficient.

Although the AWM projects had M&E systems, they were not fully operational and were not used effectively. The AWM M&E systems were specified in project documents but they were only partially operational. They generally also lacked a comprehensive set of indicators, baselines and targets. There were, however, two positive exceptions. Monitoring, through supervision missions and midterm review, allowed for follow-up assessment in Kenya. In the Rwanda-LISP project, data were readily available from the National Institute of Statistics of Rwanda.

Limitations in data accessibility due to weak monitoring and evaluation were described in the Kenyan Kimira Oluch, Madagascar, Senegal and Mali projects. Key indicators were absent in Madagascar, which hindered estimation of crop yields. Similarly, in Mali, weaknesses were found in the availability of baseline data, mid-term reviews, annual reports and financial statements. Involvement of the line ministries during project implementation and disbursement of funds was identified as a means of ensuring long-term monitoring of future projects in Kenya. Also, in Kenya, limitations were described in terms of the dissemination of key lessons and recommendations.

Although the use of pre-defined performance indicators, often from the appraisal reports were used consistently across outputs, outcomes were often weak in this respect, whereby improvements were reported but were not based upon a performance measure.

Key Issues and Lessons

The nine AWM cluster evaluation projects were implemented in different communities and varied contexts. The following five key lessons learned from the evaluation can guide the design and implementation of the Bank's future AWM interventions in the context of the Feed Africa Strategy as well as its long-term development of the agricultural sector in Africa.

Integrated Project Design and its Subsequent Adaptation During Implementation Matter in Improving Development Results of AWM Interventions

Lesson 1: AWM intervention design, based on an integrated framework that considers trade and market development changes and contexts (agricultural sector, agricultural water use, market actors), matters for the achievement of desired development results.

Ensuring more sustainable access to water in order to increase productivity and income requires a multidisciplinary approach that includes a) coordination between water, irrigation and agriculture actors, b) a value chain approach and market opportunities, c) access to credit, d) access to market infrastructures through feeder roads and, e) capacity development and private sector engagement. AWM interventions need to be supported by a robust and specific analysis coherent with local contexts and that integrate technical packages (soil, water, crop management, post-harvest training) and market aspects including value addition for farmers. The analysis should also include identification of risks and assumptions and remain flexible during implementation stages.

For instance, in the Kenya Kimira Oluch and Madagascar PRPIM projects, the non-completion of the remaining water connections, marketing linkages, extension services, post-harvest training and value addition for farmers minimize the full potential of the project to achieve development results. In addition, as in Madagascar PRPIM, the quality of the project design showed serious weaknesses that made the implementation difficult and almost threatened the achievement of the project's results.

In the Rwanda LISP, the operationalization of MCCs was not optimal due to problems with market linkages. For example, where MCCs did not establish reliable markets and subsequently were forced to sell to traders, prices paid to farmers were not attractive and regular/reliable payments to farmers were not assured. Many MCCs without well-established markets lost money through non-payment by buyers and in turn lost the trust of their members. Western milk sheds (Gishwati rangelands) had the poorest feeder roads, which significantly curtailed accessibility to milk collection points and MCCs. Within this area alone, 116 kms of feeder roads were identified as critical to linking areas of high milk production to MCCs and market centers.

Effective forest conservation cannot be realized in isolation and it is thus critical to integrate livelihood activities into conservation efforts, as was the case of Green Zones. A comprehensive capacity-building program and a marketing strategy should support the livelihood component.

The Rwanda PADAB project revived and reorganized cooperatives established around value chains with the aim of an economic objective and profitability for their members.

Poor quality of AWM interventions design does not only affect project implementation but also

undermines project development results. Finding win-win partnerships between farmers and private operators for an efficient use of available water is important for the promotion of value chains for value-added products.

Technical Aspects and Incentives are Essential for Ownership and Sustainability

Lesson 2: Intervening in AWM requires looking not only at technical solutions but also at the incentives that encourage participation and partnership (with the private sector, government and other development actors). Participation and partnership, if properly managed, improve quality, profitability, ownership, and sustainability of the intervention.

Technology choices are important and should be relevant to the beneficiary needs (multiple uses of water) and capacities, the physical characteristics of the intervention area and the scale of the project.

Furthermore, the sustainability of AWM development results is not guaranteed without the right incentives for the beneficiaries to pursue the desired common goal, fair representation of water users, and decentralization of authority at the local level.

By providing economic incentives for participation in project activities, which improved day-to-day livelihood and promise for the future, projects created conditions for ownership such as in the case of Kenya Green Zones. This was also demonstrated in Nigeria, where farmer leaders led project implementation.

Projects also promoted ownership by allowing beneficiaries to manage their own project activities through their own institutional structures such as in the Kenya Green Zones. Similarly, in Madagascar and Rwanda, beneficiaries and local officials were involved in the design and the implementation of the project either directly, or through their representative organizations and associations. This increased the likelihood of projects responding to community needs. In addition, the use of local services created stronger connections between beneficiaries and service providers, which reinforced the sense of ownership.

Projects can further enhance community ownership by integrating a broad stakeholder approach during project conceptualization and implementation such as in the Kenya Green Zones. A decentralization policy helps to build ownership. This was the case in the Rwanda projects, which were effective at involving both national and local stakeholders, which promoted a sense of ownership amongst the beneficiaries including farmers, and local officials at District and sector levels.

Technical skills should include broad political, institutional and regulatory frameworks that could help the project to create groups that have interest and capacity to improve the system. There is also need for a strong and complete network of connections between groups, consisting of actors from central and line ministries, district/local authorities, user's groups/associations/cooperatives, the private sector as well as civil society organizations (CSO).

When farmers' cooperatives were inefficiently managed due to unpredictable political context or inadequate management and organizational capacities, infrastructure sustainability was weak.

Strong rural institutions, favorable policy environments and good institutional arrangements are key for delivering development results. Ideally, a water policy and law should formally describe the roles and responsibilities of key actors and how they should coordinate their activities. This was not the case in the Madagascar PRPIM project, where key entities including the user's groups/association, decentralized authority, and the central government were not coordinating. Without clear roles and responsibilities, conflicts of competency can emerge and undermine the ability of the water system to function efficiently. In addition, as was the issue in Madagascar, a ruptured relationship between these entities had a negative effect on the provision of services.

In the Rwanda PADAB, although the cooperative approach was emphasized in the agricultural sector, greater involvement of the private sector could have put more emphasis on strengthening relations between the processing industries, or wholesale traders, involved in the priority crops to maximize income generation by concluding effective farming contracts.

Adequate Skills, Scope, and Scale of Operation

Lesson 3: AWM projects require careful and realistic planning, design, and implementation that include adequacy of the scope in terms of time required, the skills needed for support, and the scale of activities to achieve the project objectives.

The skills involved for support, scope (in terms of time required), and scale of AWM interventions need to be adequately analyzed before financing. Specific knowledge of the local situation is critical for optimal water conveyance and for resultant crop yields. In this regard, the right mix of skills is required for both the Project Implementation Unit (PIU) and supervision entities for irrigation projects. In the case of the Gambia FMRIP, there was no irrigation engineer in the PIU team. In addition, the Soil and Water Management Unit (SWMU), entrusted with supervising the design and construction of the irrigation infrastructure, lacked sufficiently experienced staff for the task.

There was a similar situation in Rwanda where the expected contribution (land clearing) of beneficiaries of the Rurambi marshland proved to be beyond their capacity. Levelling and plot

preparation works were very expensive to carry out. It is essential to carefully assess stakeholders' capacities to appropriately assign stakeholders roles in project implementation.

Timeliness in project start-up and implementation of interventions is critical to avoid cost overruns, reduction in scope for some key activities, and the loss of an entire growing season for farmers. Particular attention should be given to the award of works contracts and the choice of hydro-agricultural development companies. In this area, the delays can be very detrimental as they lead to losses of off-season agricultural campaigns and subsequent reduction in farmer's income. Successful contractors should be verified in terms of the actual availability of materials, qualified personnel and financial resources. For example, in Mali, the choice of a company with no technical, financial and organizational capacity for the execution of the works created difficulties despite the Bank's many in-country missions. In addition, the commencement of the termination process was delayed to avoid the loss of an additional off-season campaign.

Ensuring Accountability for Efficient Service Delivery

Lesson 4: AWM interventions need to be accompanied by both a credible and affordable cost-recovery strategy, and governance improvements to ensure accountability for efficient service delivery by the service provider.

Adequate cost recovery and improvements in governance are key for results-based AWM interventions. Cost recovery and good government are required for financial and economic sustainability.

For example, the economic and financial viability of the LISP project in Rwanda was unsatisfactory due to issues that project beneficiaries faced including high cost of inputs, limited access to services, and low technology in the dairy sub-sector. In fact, at farmer level as well as at MCC level, milk was still being sold as raw material for direct household consumption or to a few dairies.

In Rwanda, both the livestock water systems and the MCCs were based on simple technologies that could be manipulated by local farmers. However, the use of electricity in irrigation was relatively costly thereby constituting a threat to sustainability of project results.

In the Kimira Oluch project in Kenya, mechanisms to recover operating costs were introduced, including water fees and laws that penalized farmers who misused the water systems. Financial viability was unlikely in three other projects. For instance, in The Gambia, financial management by the farmer cooperative society was not optimal and the services could not be continued. In Madagascar, financial independence was inadequately planned, and users refused to pay user fees. In Senegal, the budget resources were insufficient and not effectively managed to support the full maintenance of facilities.

In Mali, a series of issues led to the unsatisfactory cost-effectiveness of the project including a) all resources were consumed before all planned activities were carried out; b) the choice of a company with inadequate technical and financial means as well as necessary experience resulted in the termination of the contract and subsequent awarding to other companies at a higher price of 1.117 billion CFA francs; c) an increase in the State's counterpart of approximately 1.098 billion CFA francs; and d) the assumption of other sources of financing for project works, including feeder canal cleaning and the rehabilitation dam gates

(financed by Énergie du Mali). The anticipated savings from these activities were therefore consumed without the implementation of other planned activities.

Monitoring and Evaluation for AWM Project Effectiveness and for Capturing Development Learning

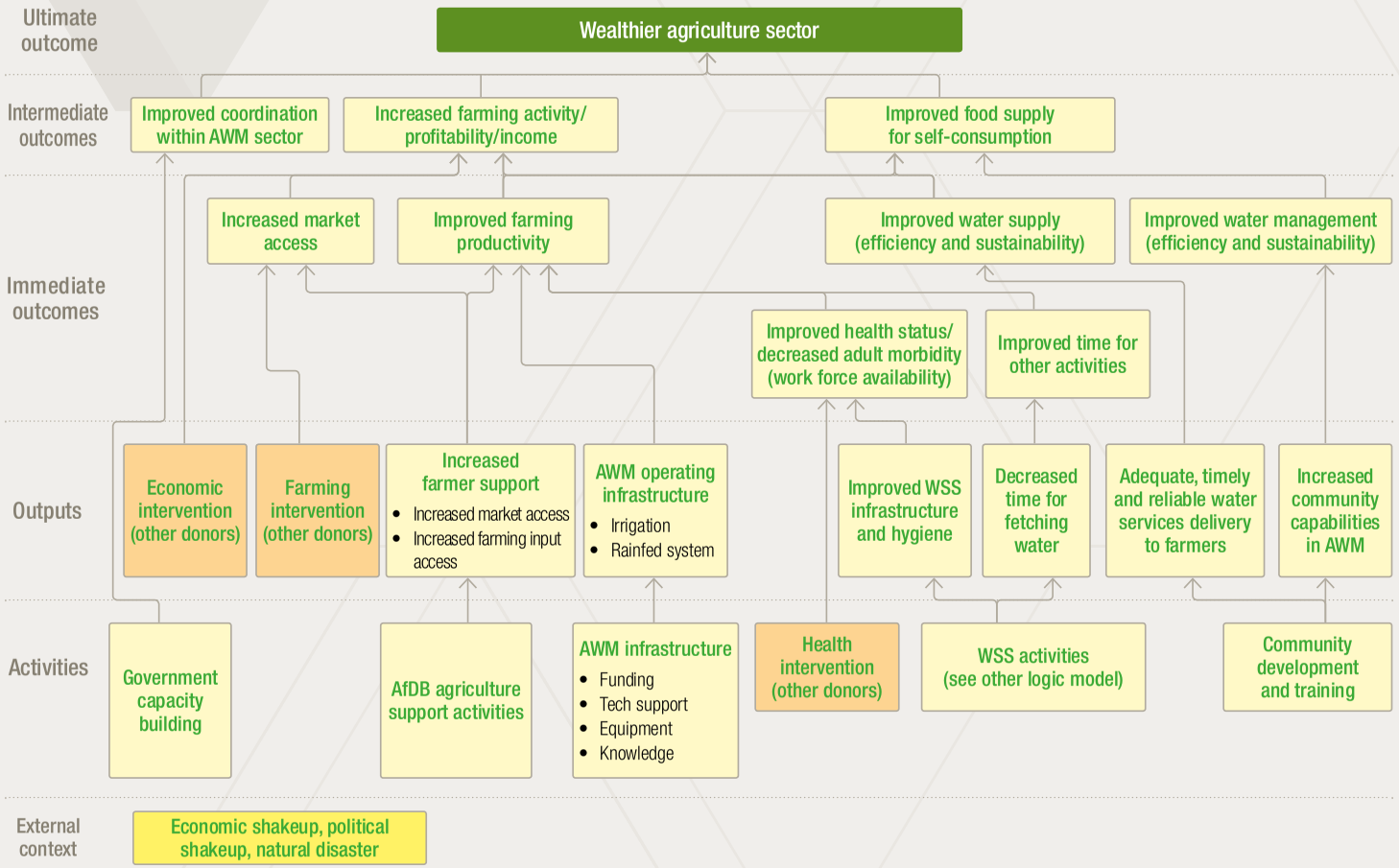
Lesson 5: Quality and functional monitoring and evaluation systems are important tools for supporting project development effectiveness, and for capturing lessons to inform the replication and scaling-up agenda of the Bank and its RMCs.

The review of the M&E systems of the AWM project cluster highlights the importance of:

- A well-designed and functional M&E framework that provides a structure for key performance indicators, progress tracking and reporting.
- Rigorous follow-up on AWM implementation plans in order to avoid delays that can negatively affect AWM project implementation performance, mainly due to the seasonal nature of the AWM activities.
- Regular outcome monitoring to ensure the project performance is on track, or to allow for timely decision-making if results are not being achieved as expected.
- Establishing appropriate indicators for monitoring unintended effects, project exit strategies, and project sustainability.

Annexes

Annex 1 — Theory of Change: Bank Support to Agricultural Water Management



Annex 2 — List of AWM Projects Considered in the Evaluation

No	Country	SAP code	Division	Project Name	Status	Group	Approval Year	Net Loan (UA Million)	Disb. Rate
Agricultural Water Management (9)									
1.	Gambia	P-GM-AA0-007	OSAN2	FARMER MANAGED RICE IRRIGATION PROJECT	COMP	AWM	2005	5,00	100
2.	Kenya	P-KE-AAZ-001	OSAN1	KIMIRA-OLUCH SMALLHOLDER IRRIGATION DEVELOPMENT PROJECT	COMP	AWM	2006	22,98	99
3.	Kenya	P-KE-AAD-004	OSAN3	GREEN ZONES DEVELOPMEMT SUPPORT PROJECT	COMP	AWM	2005	25,03	100
4.	Madagascar	P-MG-A00-001	OSAN1	PROJET DE REHABILITATION DU PERIMETRE IRRIGUE DE MANOMBO	COMP	AWM	2007	9,06	100
5.	Mali	P-ML-AAC-005	OSAN2	PROJET INTENSIFICATION BAGUINEDA	CLSD	AWM	2005	14,92	100
6.	Nigeria	P-NG-AA0-027	OSAN2	SUPPORT TO THE NATIONAL PROGRAMME FOR FOOD SECURITY IN EKITI	COMP	AWM	2006	22,00	59
7.	Rwanda	P-RW-A00-007	OSAN1	PROJET D'APPUI AU DEVELOPPEMENT AGRICOLE BUGESERA	COMP	AWM	2006	9,96	100
8.	Rwanda	P-RW-AAE-004	OSAN1	LIVESTOCK INFRASTRUCTURE SUPPORT PROGRAMME - LISP	COMP	AWM	2011	21,81	100
9.	Senegal	P-SN-A00-001	OSAN2	PROJET D'APPUI AU DEVELOPPEMENT RURAL EN CASAMANCE (PADERCA)	COMP	AWM	2005	19,32	100

Annex 3 — Performance Tables

Table A3.1: Selected AWM outcome achievement

Project	Smallholder farmers having gained access to water for irrigation or livestock			Hectares irrigated laid out and developed			Hectares of land protected		
	Planned	Actual	Achievement ratio	Planned	Actual	Achievement ratio	Planned	Actual	Achievement ratio
1. Gambia Farmer Managed Rice Irrigation Project	2 300	1 254	54.5%	1 186	1200	101.2%			
2. Kenya Kimira-Oluch Smallholder Irrigation Development Project	2 950	500	16.9%	1 474	1091	74.0%			
3. Kenya Green Zones Development Support Project									
4. Madagascar Manombo Irrigation Area Rehabilitation Project	8 000	2 000	25.0%	5 400	3 896	72.1%			
5. Mali Baguineda Irrigation Scheme Intensification Project				789	367	46.5%	205	217	105.9%
6. Nigeria Support to the National Program for Food Security in Ekiti, Ondo and Cross River States (NPFS)									
7. Rwanda Bugesera Agricultural Development Support Project	3 400	1 680	49.4%	850	500	58.8%	5 000	5 442	108.8%
8. Rwanda Livestock Infrastructure Support Program (*)	725	680	93.8%	9 000	5 128	57.0%			
9. Senegal Casamance Rural Development Support Project				200	200	100.0%	15 000	14 000	93.3%
TOTAL	**17 375**	**8 564**	**35.2%**	**18 899**	**12 765**	**65.5%**	**20 205**	**19 659**	**97%**

(*) Area of farms fed with cattle water.
Source: PARs, PCRs, PERs, stakeholder interview.

Table A3.2: Economic Internal Rates of Return – ex-ante, at completion and ex-post

Project	PAR	PCR	PER	Variation from PAR	Opportunity Cost of Capital
1. Gambia Farmer Managed Rice Irrigation Project	23	26	22	-1.00	12%
2. Kenya Kimira-Oluch Smallholder Irrigation Development Project	13.2		18.18	4.98	10%
3. Kenya Green Zones Developmemt Support Project	13.3		15.96	20.66	12%
4. Madagascar Manombo Irrigation Area Rehabilitation Project	19.7	16	-	-3.70	12%
5. Mali Baguineda Irrigation Scheme Intensification Project	23.25	20.93	14.24	-9.01	10%
6. Nigeria Support to the National Program for Food Security in Ekiti, Ondo and Cross River States (NPFS)	34	19.2		-14.80	
7. Rwanda Bugesera Agricultural Development Support Project	15.2	26	11.2	-4.00	
8. Rwanda Livestock Infrastructure Support Program					
9. Senegal Casamance Rural Development Support Project	15	24		9.00	10%

Table A3.3: Project Time Performance (months)

Project	Approval to completion [M]	Entry into force to completion [M]	Entry into force to first disbursement [M]	First disbursement to last disbursement [M]
1 Gambia Farmer Managed Rice Irrigation Project	78	66	2	43
2. Kenya Kimira-Oluch Smallholder Irrigation Development Project	119	116	4	113
3. Kenya Green Zones Developmemt Support Project	108	105	5	103
4. Madagascar Manombo Irrigation Area Rehabilitation Project	72	67	2	69
5. Mali Baguineda Irrigation Scheme Intensification Project	71	54	50	0
6. Nigeria Support to the National Program for Food Security in Ekiti, Ondo and Cross River States (NPFS)	91	83	5	86
7. Rwanda Bugesera Agricultural Development Support Project	87	85	15	79
8. Rwanda Livestock Infrastructure Support Program	76	72	0	8
9. Senegal Casamance Rural Development Support Project	108	104	7	101
Average	**90**	**84**	**10**	**66**

Annex 4 — Table on Enabling/Inhibiting Factors Internal and External to the AfDB

Project cycle step	Internal enabling/inhibiting factors	External enabling/ inhibiting factors
Needs assessment (Selectivity)	▌Availability of preparatory studies ▌Bank's support to government to find resources for preparatory studies ▌Participatory approach during the appraisal and use of local leaders to accurately assess needs ▌Level of training of beneficiaries and alignment of technical solutions according to those capacities	Government capacities to assess needs and find resources to perform preparatory studies
Project design (Efficiency + Leverage)	▌Comprehensive approach (WSS and AWM) and integration of the value chain (AWM) ▌Bank staff proactivity for leveraging, bringing partners for complementary (soft) components, and to anticipate problems ▌One-size-fits-all approach in the appraisal phase is not appropriate given the diversity of country contexts ▌Water tariffs	Government capacities to give orientation to and coordinate development aid among donors Leveraging depend on stakeholders' willingness and agenda
Partnerships/project implementation (Partnerships)	Private sector capacity to implement projects (when externalized by the country) Private sector capacities to support maintenance and sustainability Private sector to provide inputs needed along the agriculture value chain (including credit) Community involvement	Government capacities to support the private sector
Monitoring & Evaluation (Analytic capacity + Managing for Developing Results)	▌Monitoring tools in place since inception, supervision missions, mid-term review, drawing lessons. ▌Sharing of lessons and follow-up on recommendations during and across projects	Government capacities to monitor projects Government capacities to provide sustainable conditions
Other country specific context broad factors	▌Institutional, policy and regulatory framework as well as governance, transparency, and legal system to enforce legislation ▌Human resources: Turnover and brain drain, training (e.g., engineers), retiring public servants not replaced (structural policies)	

Annex 5 — Table on Timeliness of the AWM Projects

Project	Main causes of delays
Mali	-
Madagascar	-
Gambia	Capacity limitations: ▌ A time lapse of about 11 months between the signature and effectiveness of the project attributed to the limited capacity of the Gambia Ministry of Agriculture.
Nigeria	Inefficient time management: ▌ Poor Time Management, after the effectiveness date, it took (…) 8-24 months for the key officials to be appointed at the national level. This hindered and adversely affected project implementation. Staff shortfall/capacity issues: ▌ The commencement of project implementation suffered 30 months delay due to seeming ill-preparedness of implementers at the national level (national office was not ready, critical staff were not hired on time and when hired they were inadequate in number and sometimes in competence). This problem of inadequate staff only got resolved partially when the Food and Agriculture Organisation of the United Nations (FAO) seconded a technical staff to help system.
Kenya-Green Zones	Inadequate procurement system ▌ The process of procuring inputs through the Government of Kenya agencies was associated with higher costs compared to direct acquisition. This mode of disbursement created delays which lead to high project costs due to inflation. Political instability ▌ Political instability experienced during the 2007 post-election violence and the numerous clashes that characterize the Rift Valley region particularly Nakuru, Narok, TransNzoia and Elgeyo Marakwet counties led to implementation delays and destruction of some of the project outputs such as Penon Forest Station. Staff turnover ▌ New officers were introduced into the project during this time leading to delays in implementation of activities.
Kenya-Kimira Oluch	Slow procurement system ▌ Fund disbursement at project level was timely, but delays were experienced due to GoK bureaucracy delaying some of the project activities. Design changes ▌ The project had unforeseen changes and plan alterations, which delayed its kick off and increased the cost. Funds for some key components had to be reallocated to cater for the additional infrastructure that was not catered for at the proposal stage. This led to a delay in completion of some key infrastructure such as the secondary and tertiary canals meaning that the farmers could not start to benefit from irrigated agriculture at the targeted time. Political instability ▌ In Kenya Kimira Oluch, the commencement of construction of main and secondary irrigation infrastructure lagged due to inadequate budget for the works, and the effect of post-election violence of 2008.
Senegal	Delays in project start and implementation, slow procurement processes, security issues, capacity issues, weather/ season-related challenges: ▌ There are several reasons for this situation, the key ones being related to start-up delays, the participatory approach implemented for site selection, the high number of acquisitions, cumbersome procurement procedures and the seasonal nature of the project, the construction of hydro-agricultural works and developments, the overall weakness of the enterprises, the seasonal nature of the activities related to the early wintering and the security conditions that sometimes impeded travel in Casamance.

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Aide-mémoire mission de supervision 16 au 21 mai et 03 juin au 10 juin 2011

Aide-mémoire mission de supervision 17 au 26 novembre 2009

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Endnotes

1. AfDB, FAO, IFAD, IPTRID, IWMI, and World Bank.
2. Challenge Program on Water and Food.
3. Consultative Group on International Agricultural Research.
4. African Water Vision calls for an increase in the development of the water resources potential in Africa by 25 percent by 2025.
5. Feed Africa is one of the five top priorities of the Bank's new strategic approach to Africa's development for 2016–2025, known as the 'High 5s', the other four being 'Light Up and Power Africa'; 'Integrate Africa'; Industrialize Africa'; and 'Improve the quality of life for the people of Africa'. Feed Africa marks a strategic shift for the Bank towards Agriculture as one of its top priorities. The vision of the Strategy is to transform African agriculture into a competitive and inclusive agribusiness sector that creates wealth, improves lives and secures the environment.
6. SAP, October 28th, 2016.
7. Global Agriculture and Food Security Program.
8. Irrigation schemes comprise: intake, earth dams, canals (main, secondary and tertiary), irrigation pumps, livestock watering system, erosion control structures, etc.
9. This can include feeder roads, wells, toilets, storage and drying facilities, meetings sheds, day care centers, rural market structures, agro processing equipment, veterinary clinics, milk collection centers, etc.
10. This site was given a priority because it presented some advantages including large surface area to be served (6,467 ha) and the number of farms to be served (967). The source is gravity feed with low cost while other identified sources needed pumping works, hence they were costly.
11. In Kenya KOSFIP, the targeted infrastructure was not completed on time. It has remained incomplete due to lack of funds. Some farmers have spent their money to buy pumps while others use bucket irrigation, thus the full potential of irrigation has not been realized.
12. The construction/rehabilitation of dams and water reservoirs for irrigation were cancelled during the Mid-Term Review.
13. The Kenya Green Zones project did not include an objective to increase access to water, as it was mainly concerned with water conservation.
14. The water-users' organizations have not yet gained the required financial autonomy. Due to the technology choice, the electricity costs of operating the system are high.
15. The RFCS failed to provide adequate incentives for gate operators and other members of the Scheme Management Committee. Due to the lack of incentives, the operators did not maximize their efforts in drainage and irrigation as the high tides occurred late at night and early in the morning.
16. Five of the nice projects (Kenya Green Zones, Gambia, Rwanda PADAB, Senegal, Nigeria) were built on community ownership.

IDEV

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African Development Bank

An IDEV **Project Cluster Evaluation**

About this Evaluation

This report summarizes the results of a cluster evaluation of nine AfDB-funded Agricultural Water Management (AWM) projects in seven countries that were implemented between 2005 and 2016, in different communities and under varied contexts. Data were collected from multiple sources including desk review, project site visits, and interviews with key stakeholders. Each category of data was analyzed using mainly descriptive statistics and a stakeholder feedback workshop was held in each of the seven countries to validate the collected data.

The agriculture and rural development sector is a priority for the Bank in supporting livelihoods and food security. The ultimate goal of the Bank's interventions in AWM is to reduce poverty and enhance socio-economic development through increased and sustainable agricultural productivity, increased rural revenues, and enhanced food security. This AWM cluster evaluation drew lessons which the Bank and its stakeholders, including governments, civil society and other development agencies, can use in designing and implementing future AWM interventions in the context of the "Feed Africa" Strategy.

The evaluation distilled five key lessons, including the importance of an integrated AWM intervention design framework; the role of incentives that encourage participation and partnership; the need for careful and realistic planning, design and implementation; the need for a credible and affordable cost-recovery strategy and sound governance structure; and the importance of quality and functioning monitoring and evaluation systems.

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