AFRICAN DEVELOPMENT BANK GROUP

OPERATIONS EVALUATION DEPARTMENT

(OPEV)

Agricultural Water Management

An Evaluation of the African Development Bank's Assistance in Ghana and Mali

1990-2010

High Level Evaluations Division (OPEV.2)

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ABBREVIATION AND ACRONYMS

AAGDS	Accelerated Agricultural Growth and Development Strategy
ADB	African Development Bank
ADF	African Development Fund
AFCR	Africa Food Crisis Response
AFD	French Development Agency
AfDB	African Development Bank
AGETIER	Agence d'Exécution des Travaux d'Infrastructures et Equipements Ruraux
AgSSIP	Agricultural Services Sub-Sector Investment Programme
AMCOW	African Ministers' Council on Water
AWM	Agriculture Water Management
AWTF	Africa Water Task Force
CBRD	Community-based Rural Development
CFAF	Franc de la Communauté Financière d'Afrique
CIDA	Canadian International Development Agency
CMDT	Malian Textiles Development Company
CPS	Cellule de Planification et de Stratégie
CSCR	Growth and Poverty Reduction Strategy
CSD	Crop Services Division
CSP	Country Strategy Paper
DAC	Development Assistance Committee
DANIDA	Danish International Development Agency
DFID	Department for International Development
DNGR	National Rural Engineering Service
DNH	Direction Nationale de l'Hydraulique

DPS	Direction de la Planification et de la Statistique
ERR	Economic Rate of Return
ESW	Economic and Sector Work
FAO	Food and Agriculture Organization
FASDEP	Food and Agriculture Sector Development Policy
GDP	Gross Domestic Product
GIDA	Ghana Irrigation Development Authority
GPRS	Ghana Poverty Reduction Strategy
GTZ	German Technical Cooperation
HIPC	Heavily Indebted Poor Countries
ICOUR	Irrigation Company of Upper Region
IDI	Institutional Development Impact
IEG	Independent Evaluation Group
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IVRDP	Inland Valleys Rice Development Project
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KIP	Kpong Irrigation Project
LDP	Livestock Development Project
M&E	Monitoring and Evaluation
MDG	Millennium Development Goal
MENOR	National Results-based External Monitoring
MLGRD	Ministry of Local Government and Rural Development

MOFA	Ministry of Food and Agriculture
NEPAD	New Partnership for Africa's Development
NRGP	Northern Growth Development Program
NTF	Nigerian Trust Fund
ODRS	Office de développement rural de Selingué
OECD-DAC	Organisation for Economic Co-operation and Development
ONGR	National Offices of Rural Engineering
OPEV	Operations Evaluation Department (AfDB)
OPIB	Baguineda Irrigation Agency
OSAN	Agriculture and Agro-Industries Department
PADER	Rural Development Support Project of Mopti Region
PAPIM	Projet d'Aménagement du Périmètre Irrigué de Manikoura
PCR	Project Completion Report
PDI-BS	Bani and Selingue Basin Irrigation Development Programme
PMB	Moyen Bani Plains Development Programme
PMU	Project Management Unit
PPER	Project Performance Evaluation Report
PPMED	Policy, Planning, Monitoring and Evaluation Division
PRSP	Poverty Reduction Strategy Paper
QAE	Quality at Entry
RMC	Regional Member Country
SAP	System Application Project
SDR	Service du Developpement Rural
SNDI	National Irrigation Development Strategy
SSIDP	Small-scale Irrigation Development Project

SWAp	Sector-wide Approach
TAF	Technical Assistance Fund
UA	Unit of Account
UAC	Unit of Account
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USD	United States Dollar
VIP	Village Infrastructure Project
VRA	Volta River Authority
WAEMU	West African Economic and Monetary Union
WRC	Water Resources Commission
WTO	World Trade Organization

FOREWORD

Agricultural water is concerned with making water available and accessible for agricultural purposes. These measures involve variable combinations of irrigation, drainage and flood control, water conservation and storage, on-farm water management, and institutional support to improve sustainability, user operation and management. Collectively, these interventions are called **Agricultural Water Management** (AWM).

The African Development Bank has been one of the leading sources of assistance for agricultural water management (AWM) in Africa, and over the years, the Bank has invested relatively heavily in irrigation and drainage projects in support of African agriculture.

This independent evaluation was undertaken by the Operation Evaluation Department (OPEV) to examine the effectiveness of African Development Bank support to the AWM in Ghana and Mali from 1990 to 2010. The purpose of the evaluation is to assess past experiences, draw lessons and formulate recommendations to inform and guide the Bank's future investments in this sub-sector. The report provides an assessment of the relevance, efficacy, efficiency and sustainability of the Bank's assistance to AWM in Ghana and Mali. The evaluation findings, conclusions and recommendations were informed by a series of desk reviews, and by many interviews and discussions with countries officials, projects staffs and other stakeholders during countries and projects field visits.

This report was prepared by Guy Blaise Nkamleu, Principal Evaluation Officer (OPEV), with significant contributions from Ignacio Tourino (Senior Evaluation Officer), Peter Bisset (Consultant), Biyi Daramola (Consultant), Njankoua Wandji (Consultant), SCET-Tunisie (Consulting Firm). Akua Arthur and Gaaloul Manel provided research assistance for data collection for the portfolio analysis. The report received peer review and advice from Keith Pitman and Victor Manyong (Consultants). The review benefitted from comments and discussions on substantive issues with colleagues from Agriculture and Agro-Industry Department (OSAN). The OPEV Department staff provided input on the methodology and the draft report at different phases of the preparation. Odile Keller, Division Manager, OPEV.2 provided an extensive review of the draft report at different stages and provide advice on methodological issues and the structure of the report. Preparation of the final report was supervised by Franck Perrault, Ag. Director, OPEV, and Odile Keller, Division Manager, OPEV.2. Any further matters relating to this report may be referred to G.B. Nkamleu (extension 2241) or O. Keller (extension 2195).

OPEV is grateful to all who contributed to this evaluation. We would like to particularly acknowledge and thank all stakeholders with whom we interacted during field visits in Ghana and Mali.

EXECUTIVE SUMMARY

Background

Financing infrastructure is a central plank of the work of the African Development Bank's (the Bank's) work, and since its establishment in 1964, the Bank has invested relatively heavily in irrigation and drainage projects in support of African agriculture. Water is an essential resource for agriculture; and by some estimates, as much as 88 percent of all water use in Africa in the 1990s was for agricultural production. This report presents an evaluation of the effectiveness of the Bank's assistance to agriculture water management (AWM) in Africa during 1990-2010, with particular focus on Ghana and Mali. Bank projects with either a major or subsidiary AWM focus were evaluated using the standard evaluation criteria for relevance, efficacy, efficiency, institutional impact, and sustainability. This evaluation analyses the role that AWM plays in agriculture, and assesses the contribution of the Bank's AWM portfolio to the overall development in the two countries.

Methodology

The evaluation was undertaken in five phases, each of which included complementary activities and deliverables. A separate report was produced in each phase: (1) a literature review, which examined a wide range of documents produced by the Bank, as well as reports and publications prepared by other institutions; (2) a portfolio exploration of the Bank's AWM operations in Africa, which explored 517 Bank-approved operations in the agricultural sector between 1990 and 2007, with a focus on the 217 operations with a water component. Operations in which a water-related component accounted for 50 percent or more of the Bank's financing were called "dedicated" AWM. The agricultural water portfolio comprised 136 dedicated and 81 non-dedicated operations; (3) country sub-sector reviews, consisting of extensive analyses undertaken at country level through desk reviews, interviews, and field visits. Ghana and Mali were chosen for country case studies, and extensive field visits enabled the collection of relevant information; (4) project evaluations, consisting of post-evaluations of three closed projects in Ghana and Mali. The main criteria for project selection were the completion of activities and availability of a project completion report (PCR). Within the scope of the Bank AWM operations in Mali, two projects were closed, with PCR (Programme de Mise en Valeur des Plaines du Mo*yen-Bani,* or PMB; and the *Projet d'Aménagement du Périmètre Irrigué de Maninkoura,* or PAPIM). In Ghana, there was one closed project with a PCR (Kpong Irrigation Project, KIP); and (5) the synthesis phase, which provides a synthesis of all observations and results. The current evaluation report is part of this phase. Although the conclusions, lessons learned, and recommendations from this evaluation are specific to Ghana and Mali, where OPEV undertook in-depth investigations, they could in some instances be applicable more broadly to all regional member countries (RMCs).

Findings

The literature review devoted attention to a host of issues related to agricultural water, with particular reference to Africa. There are at least three generic issues emerging from this literature: First, *poor policy and institutions are still viewed as the bottleneck for the agricultural water sector* in Africa, and fundamental changes in institutional arrangements and management practices are required to overcome challenges in this sub-sector. Second, *irrigation investment is costly*, particularly in sub-Saharan Africa (SSA). The high irrigation investment cost, coupled with low productivity of irrigated land, has serious implications for poverty reduction and the economic viability of agriculture schemes in Africa. And third, *weaknesses in planning and implementation appear to be a key reason for the disappointing results* of agricultural water development and management in Africa. In particular, monitoring and evaluation (M&E) of agricultural water investment projects in SSA has generally been poor and is likely to have had a negative impact on project outcomes.

The portfolio overview, covering the period 1990-2007, identified 217 AWM operations with an approval value of US$ 3.447 billion. In comparison, agriculture (excluding water) had approvals of US$3.536 billion for 300 operations. The African Development Fund (ADF) provided 84 percent of the funding for the AWM operations. The portfolio review shows that some 50 percent of all AWM financing went to 8 countries (Morocco, Tunisia, Ghana, Nigeria, Mali, Malawi, Kenya, and Ethiopia). In general, the West Africa region received the highest amount of AWM lending. Overall, AWM funding generally increased in the period 1996-2001, but has since declined, although there has been an increase in AWM multi-country operations and a raise of AWM operations in the East of the continent.

The country sub-sector reviews and project evaluations in Ghana and Mali revealed that the Bank has been one of the largest sources of assistance for AWM in both countries during 1990-2010. In Mali, the Bank had a total of 16 operations with an AWM component, consisting of 10 projects, 5 studies, and one line of credit. Seven of the 10 projects focussed primarily on AWM, whereas water component was a minor component in 3 projects. In Ghana, there were 9 AWM operations, consisting of 7 projects and 2 studies; both studies and 3 of the projects had AWM as a major focus. The investigations in both countries reached the following conclusions regarding the evaluation criteria:

Relevance and quality at entry. In both countries, the AWM projects were very relevant and fully aligned to Government objectives and Bank strategy, as expressed in the relevant strategy papers. However, they failed to analyse all the investment options available from wider sources. Despite the in-depth studies preceding many projects, unexpected problems cropped up at implementation due to the long delay between completion of the study and start of the project,

and in some cases, inadequate social and sub-soil investigations. Globally, subsequent projects failed to reflect learning from past projects.

Efficacy and efficiency. Attainments of physical and institutional targets have fallen far short of expectations. In Mali, the Bank's projects were found to be good at delivering outputs, but weak in translating outputs into outcomes and impact. Civil works were at the centre of reduced efficacy and efficiency in both Mali and Ghana; problems such as difficult procurement processes, poor supervision, and delays leading to increased costs, led to adverse impacts such as a scaling back of project activities, and contesting of contract provisions among the Bank, the implementing agency, and the contractors. In addition, other project components were reduced or cancelled to enable completion of civil works, after cost overruns, and incomplete work at project-end made schemes unusable. These shortfalls reduced project benefits, or were so severe in isolated cases that they may even have left farmers worse off than if the project had not existed. In general, however, beneficiaries appear to have gained from the investments, although not as much as had been projected.

Impact on institutional development was effective in Mali but restricted to local management of the schemes, with limited comprehensive nationwide impact on institutions in the sub-sector. In Ghana, the main target for institution building was a national organisation, the Ghana Irrigation Development Authority (GIDA), but the impact of AWM activities on GIDA was disappointing.

Sustainability. In both countries, sustainability was the area of greatest concern. Sustainability was constrained in some cases by technical and strategic issues, Government commitment, socio-political and economic environment, and institutional and environmental settings. But for most projects, the low level of sustainability resulted from the lack of economic sustainability at the farmer or household level. This seems to be a problem common to all schemes, large or small, whether gravity fed or pumped. The value of rice, the main crop produced, is just not sufficient.

Lessons

From this evaluation, three major lessons can be drawn for AWM in Ghana and Mali.

a. **AWM projects present particular challenges and therefore require very careful planning, design, and execution to avoid failures or leave the beneficiaries worse off.** Those challenges include the irreversibility of AWM development; the seasonal nature of AWM activities; the vulnerability of unfinished work; and susceptibility to flexibility in the execution of activities.

b. **AWM must change some aspects of the social and cultural structures if it is to be successful**. For farmers to take advantage of the opportunities arising from

irrigation development, changes in the farming system, access to land, or social organisation are necessary, and an enabling environment for these changes should exist. AWM projects need to internalize the learning process that will lead to the necessary changes.

c. **The success in introducing a complex change process is very much linked to the right sequencing of project activities.** AWM projects typically have several closely linked phases—civil works are linked to training, formation of users associations, provision of inputs, and credit. Delay in a single activity may have a significant effect on other activities or on the whole project.

Recommendations

In order to improve Bank effectiveness in the AWM sector in Ghana and Mali, the following recommendations are offered:

1. **The Bank must invest more resources in high-quality, timely, and relevant economic and sector work (ESW) to contribute to strategic reflection at the country level and improve the quality of its AWM projects.** The Bank should be more creative in developing country strategies, informing government policy, acting as a critical friend, and keeping abreast of research in the sector. Key technical and socio-economic issues to be addressed include soil mapping and hydrological surveys, the economics of rain versus irrigation farming, the choice between large versus small irrigation perimeters, responsibilities for management of irrigation land, and role of large private firms versus small holders. At the project level, given the particular challenges in implementing AWM projects, sufficient resources should be invested in feasibility studies to provide a broad assessment of risks and opportunities, and to ensure an understanding of the changes that must occur for the project to deliver its intended benefits.

2. **From the project concept stage, the Bank should engage more with a range of stakeholders, including authorities, donors, the private sector, and smallholders, at both the national and local levels, to ensure that an enabling environment exists for the project to be successful.** Issues such as the settlement of land tenure problems around AWM, development of water users groups, and engagement with the private sector should be at the center of the dialogue and engagement. The Bank's exit strategy should be developed at the outset of the project, in close collaboration with the different stakeholders to encourage them to take over when Bank support ends. With the new Bank's Agriculture Sector Strategy 2010-2014, future AWM projects will focus only on

infrastructure, and other components will be carried out by other partners. The ability of the Bank to identify strategic partners will be crucial from that perspective.

3. **The Bank should increase its focus on policy and institutions, and strengthen the internal management capacity of AWM-related bodies.** The Bank's agricultural sector policy recognizes that the main challenge facing AWM is the weak institutional capacity to manage and maintain installed irrigation structures. The capacity development needs for AWM should go beyond individuals to encompass the wider issues of organizations within which the individuals work, and the social and economic environment within which organizations and individuals function.

4. **The Bank needs to be more realistic about the expected results of AWM operations, the time required for implementation, and the conditions for sustainability.** This will require factoring in the experience of previous operations. With regard to sustainability, the Bank should not only focus on cost recovery, but also revisit the rationale behind AWM projects, including the choice of rice as the target crop in most interventions.

5. **The Bank needs to improve its quality control and facilitation roles to ensure a smooth and high-quality implementation of its AWM operations.** In particular, the Bank should undertake adequate capacity assessment at project inception, and provide appropriate and timely training on procedures to relevant country officials. More flexibility and responsiveness need to be built into project design and/or into the individual civil works contracts. The Bank should improve supervision missions in terms of composition and duration, which implies recruiting more specialized staff and making greater use of field offices.

6. **The Bank should pay closer attention to monitoring and evaluation of projects and incorporate lessons into project design.** This includes better documentation and data collection. The SAP system should be redesigned to ensure better reliability of supervision data, and make M&E information a resource which could be used by both the Bank and Borrower. The Bank should consider supporting in-country M&E capacity and medium to long-term master plans for irrigation development.

CHAPTER 1. INTRODUCTION

1.1 Background and Objectives of the Evaluation

1.1.1 One of the main major reasons that Africa lags behind other regions on most of the Millennium Development Goals (MDGs) is the underperformance of agriculture, which in 2007 accounted for 30 percent of its gross domestic product (GDP) and employed 75 percent of its population. The weak performance of the agricultural sector is the result of a variety of constraints, an important one being the scarcity and poor management of water.

1.1.2 The African Development Bank has been one of the leading sources of assistance for agricultural water management (AWM) in Africa during the 1990-2010 period. The Operation Evaluation Department (OPEV) initiated an evaluation of the Bank's assistance to AWM covering the period 1990-2010. This report presents the findings for Ghana and Mali. It represents the first evaluation done by OPEV in the area of AWM.

1.1.3 The objective of the report is to evaluate past experiences, draw lessons, and formulate recommendations to inform and guide the Bank's future investments in this sub-sector; as well as to provide timely insight into specific issues relevant to the Bank's renewed focus on agricultural water in Africa. The evaluation was guided by two main evaluation questions: (1) has the Bank's support for AWM produced sustainable results? and (2) what lessons can be learned that will improve the effectiveness of Bank support for AWM?

1.2 Scope, Methodology, and Limitations

Scope and methodology

1.2.1 The evaluation was undertaken in five phases, each of which included complementary activities and deliverables. Separate reports were produced for each phase:

a. A literature review of a wide range of documents, including those produced by the Bank as well as reports and publications prepared by other institutions. This review helped to form a broad understanding of the trends, prospects, and challenges in the agricultural water sub-sector.

b. A portfolio exploration of the Bank's AWM operations in Africa identified 517 Bank-approved operations in the agricultural sector between 1990 and 2007, and concentrated on the 217 operations that had a water component. Operations in which a water-related component accounted for 50 percent or more of the Bank's financing are called "dedicated" AWM. The agricultural water portfolio comprised 136 dedicated and 81 non-dedicated operations. The study includes a description and analysis of the portfolio of the agriculture and AWM sub- sector, and provides the broader canvas of the Bank's AWM in Africa.

c. Country sub-sector reviews: Extensive analyses were undertaken at country level both through desk reviews, interviews, and field visits. The primary objective was to answer the

main evaluation questions from the country perspective, while addressing the country assistance program for AWM as a whole. Ghana and Mali were selected as country case studies, using objective criteria to help *a posteriori* testing of a range of hypothesis. The choice was guided by several factors: (i) for the study period, West Africa alone comprised 84 AWM operations, almost 40 percent of the total; (ii) these two countries were among those that received the most AWM investments; (iii) Mali received more AWM operations in total, while Ghana received more funding for AWM; (iv) water problems in arid and non-arid countries are different. Mali is an arid land-lock country, while Ghana is a coastal country, so the two countries face different technical and institutional challenges.

The country sub-sector reviews took a macro view to gain a comprehensive understanding of the development effectiveness of the Bank's assistance to AWM at the country level. In Mali, the portfolio included 16 operations with an AWM component, consisting of 10 projects, 5 studies, and one line of credit. Seven of the ten projects were dedicated AWM, while water was a minor component in three of the projects. In Ghana, there were 9 AWM operations, consisting of 7 projects and 2 studies. Both of the studies and 3 of the projects in Ghana had AWM as a major focus.

d. Project evaluations: This phase consisted of post-evaluation of three projects in Ghana and Mali. The main criteria for the selection of the projects were completion of activities and availability of a project completion report (PCR). In Mali, two AWM operations had PCRs (the *Programme de Mise en Valeur des Plaines du Moyen-Bani*, or PMB; and the *Projet d'Aménagement du Périmètre Irrigué de Maninkoura*, or PAPIM). In Ghana, there was one closed project with a PCR (*Kpong Irrigation Project*, or KIP).

e. Synthesis phase: This phase consisted of triangulating the information from different sources and synthesizing all observations, conclusions, lessons learned, and recommendations. This phase includes the write-up of this final report. This evaluation uses the standard evaluation criterion of relevance, efficacy, efficiency, sustainability, institutional development impact, and borrower and Bank performance. These criteria were rated on the standard four-point scale: 1 – highly unsatisfactory; 2 – unsatisfactory; 3 – satisfactory; 4 – highly satisfactory.

Limitations

1.2.2 Although the evaluation was conducted through a careful and comprehensive review of relevant documents—as well as many discussions and consultations with Bank staff, in-country stakeholders, beneficiaries, and with other development partners—it was limited by the fact that it focused only on two countries, so the findings cannot be extrapolated to the Bank's entire AWM portfolio. However, the results of this evaluation are indicative of the kinds of issues facing the Bank's AWM operations in other countries.

CHAPTER 2. AWM IN AFRICA AND THE BANK

2.1 Bank Policies and Strategies for AWM

2.1.1 Agriculture and rural development has always been a major component of the African Development Bank's portfolio, although its relative importance in the portfolio has declined over the past decade. However, agricultural development is benefitting indirectly from the Bank's activities in other sectors, such as rural roads and transport, energy, communications, and water and sanitation.

The Bank has never had an articulated policy for agricultural water interventions. Elements of its strategy are found in disparate policy documents.

2.1.2 The Bank has adopted strategies that recognize the decisive role of agriculture in eliminating poverty in Africa; but it has never, strictly speaking, had an articulated policy for agricultural water interventions. Elements of the Bank's strategy in this sub-sector began to emerge in 1989 from disparate policy documents, mainly: (i) the water and sanitation sector policy document, issued in April 1989; (ii) the agricultural sector policy paper, issued June 1989; and (iii) the environmental policy document, issued June 1990. Since February 2000, the Bank Group's interventions in the water sector have been guided by the *Policy for Integrated Water Resources Management.* Under this policy, the development of water resources and rural infrastructure are among the Bank's key priority areas in Africa.

2.1.3 In addition, the Bank has established and hosted specialized water funds. In September 2001, at the meeting of African Water Stakeholders in Abidjan, Côte d'Ivoire, the participants established the Africa Water Task Force (AWTF) for the purpose of prioritizing African water issues. In 2002, the AWTF proposed the establishment of the African Water Facility to mobilize resources to finance water infrastructure and support investment facilitation activities in Africa. In April of that year, at a conference in Abuja, Nigeria, the African Ministers for Water Resources established the African Ministers' Council on Water (AMCOW) to provide political leadership, policy direction, and advocacy in the use and management of water resources and for the achievement of the African Water Vision; as well as for implementation of the related Framework for Action. In spite of this expressed continental concern, the role of the AMCOW and the related African Water Fund has not been very visible in the Bank's agricultural water assistance in regional member countries.

Given the resurgence of interest on AWM in Africa, funding and investments are expected

2.1.4 The importance of investment in agricultural water is expected to grow in the coming years, given the recent resurgence of interest and commitments in this sector. After a special session on agricultural water use in Africa held in 2008, during the African Water Week conference, the African Development Bank, the New Partnership for Africa's Development (NEPAD), and the World Bank issued a call for increased funding and a renewed focus on AWM in Africa, including irrigation, drainage, and rainwater harvesting. Subsequently, in July 2008, the Bank established the Africa Food Crisis Response Framework (AFCR), which envisions the development of up to 500,000 hectares for improved AWM, and an increase in

storage capacity in Africa by at least one percent—an additional 8.5 billion cubic meters—for water for multi-purpose use. A business plan for agricultural water development aimed at achieving these targets was issued in 2009; and the Bank, in collaboration with other partners, is expected to prepare and mobilize the investments necessary to achieve these targets by 2013.

2.1.5 The Bank's most recent policy document in this area is the Agriculture Sector Strategy 2010-2014, which states that the Bank will focus its agricultural operations on two pillars: agricultural infrastructure, and renewable natural resource management. In both of these pillars, AWM will occupy a prominent position. The new strategy also reiterates the AFCR objectives of 500,000 hectares for AWM and 8.5 billion cubic meters of water storage as two of the core sector indicators to be achieved by 2014.

2.2 Overview of Bank Support for AWM in Africa

2.2.1 A review of the Bank's agriculture portfolio for the period 1990 to 2007 found that between 1990 and 2007, the Bank approved 517 operations in the sector. An examination of the 517 operations showed that there were 217 operations with a water component. At 2007 prices, US$3.447 billion was approved for the 217 AWM operations. In comparison, agriculture excluding water had approvals of US$3.536 billion for 300 operations. Operations with a water-related component that accounts for 50 percent or more of the Bank's financing are called "dedicated" AWM. The agricultural water portfolio comprised 136 dedicated and 81 non-dedicated operations. The distribution by source of funding shows that 10 percent of the total funding of the dedicated AWM projects were funded by the African Development Bank (ADB), 84 percent by the ADF, 2.8 percent by the Technical Assistance Fund (TAF), and 0.8 percent by the Nigerian Trust Fund (NTF). The non-dedicated AWM projects show a similar pattern.

2.2.2 In terms of geographic coverage, 41 countries received AWM financing from the Bank during the period 1990-2007, but 24 countries had more than 85 percent of the total number of AWM operations. By lending amount, 50 percent of all AWM financing went to only 8 countries: Morocco (408 million UAC), Tunisia (303 million), Ghana (251 million), Nigeria (209 million), Mali (193 million), Malawi (169 million), Kenya (167 million), and Ethiopia (151 million).

2.2.3 Regionally, West Africa had the largest amount of AWM lending. Globally, there was a significant increase in AWM lending between 1990-95 and 1996-01 in the West, North, and South, followed by a steep decline, especially in the south and north between 1996-01 and 2002-07. From 1995, the Bank's investment in AWM operations in the central region was nil. Although globally modest, the Bank's involvement in multi-country AWM operations increased by more than 100 percent after the adoption of its Integrated Water Resources Management Policy (IWRM) in 2000.

CHAPTER 3. AWM SUB-SECTOR AND AWM PORTFOLIO IN GHANA AND MALI

3.1 AWM Contexts in Ghana and Mali[1]

Institutions and legal framework

3.1.1 Ghana and Mali have similar structures with overall responsibility for water resources-the *Water Resources Commission* in Ghana and the *Direction Nationale de l'Hydraulique* of the Ministry of Energy and Water in Mali. Both agencies concentrate on potable water and larger commercial abstraction, but are also responsible for basin-wide planning and for collating, storing, and disseminating data on water resources.

3.1.2 In Mali, the National Rural Engineering Service (DNGR), a part of the Ministry of Agriculture, is responsible for designing and engineering schemes. In Ghana, these functions are carried out by GIDA, an autonomous body developed from the equivalent of DNGR within Ghana's Ministry of Food and Agriculture (MOFA). Micro-scale schemes and extensions are the responsibility of the Crop Services Division (CSD) of MOFA. GIDA was the implementing agency for two of the three Ghana AWM projects, while CSD/MOFA was responsible for the third. In Mali, the projects were implemented by local "offices," which are autonomous bodies able to raise funds for themselves in addition to state funding. This meant that all AWM projects in Mali were administered locally rather than by a centralised body.

Physical resources and current utilisation

3.1.3 Mali has about twice the available fresh water per capita as Ghana. This is counter-intuitive, since Ghana appears well watered and Mali is a dry country. However, much of Mali's water resource is in the seasonal flood of the Niger River, which can be only partially utilised, and in the Senegal River, along which there is limited land in Mali suitable for AWM development. Both countries have large inland valley areas—low-lying lands that could be irrigated from water courses running through them.

3.1.4 The main source of irrigation water in Mali, except in the extreme south, is the Niger River and its effluents. In Ghana, there is the Volta River and several other large rivers in the south of the country. The seasonal flood regime of these rivers brings abundant water; conversely, low-season flows are very limited. Water storage in the Niger Basin is very limited; the storage behind the Selingue dam is sufficient only to maintain the minimum agreed flow in the Niger where it leaves Mali, and there is little potential for increasing year-round irrigation. In Ghana, however, Lake Volta stores several years' flow of the Volta River. Discharge is regulated to maximise hydroelectric power but remains rather stable, allowing certainty over water availability at off-take structures. There is sufficient water availability to greatly increase year- round irrigated farming below the dams. Each country uses is inland valley in a different way. In the south of Mali, the valleys have been developed for rainy season rice, and they are

[1] See Annex 3 for more details on the institutional, regulatory and physical context of the AWM in both countries.

farmed by local people as part of their integrated farming system. Limited areas are also populated with higher-value crops in the dry season. The system in the north of Ghana is similar, but the degree of development and pressure on the inland valleys is much lower, since they are used mainly for dry-season grazing by herds. In the south of Ghana, with bi-modal rainfall, the farming system focuses on high-value tree crops and rain-fed maize and cassava in upland areas. The year-round availability of water permits the growing of higher-value crops as well as rice, where soil conditions are suitable.

3.2 Bank Agriculture and AWM Portfolio in Ghana and Mali, 1990-2010

Agriculture portfolio

3.2.1 ***Ghana:*** Bank lending to Ghana during the study period totalled UA 854 million (about UA 47 million a year), of which agriculture made up 40 percent. However, Bank assistance was a relatively minor component of total international development assistance in Ghana, making up less that 3 percent of the total in any year (as noted by the country assistance evaluation carried out in 2006). There were 21 operations in the agriculture sector, of which 15 were projects, 3 were studies, 2 were lines of credit, and one was an emergency assistance programme. The total value of the interventions was UA 363 million. On average, 65 percent of the project costs were covered by the Bank and 35 percent by other partners.

3.2.2 ***Mali:*** Total Bank Group lending to Mali has exceeded UA 20 million per year since 1997, and agriculture has consistently been a key area of investment, making up, on average, 33 percent of the total, and exceeding 60 percent some years. During the 1990-2010 period, Mali also had 21 operations in the agriculture sector, comprising 15 projects, 4 studies, one credit line, and one emergency assistance programme. The total value of all 21 interventions was UA 233 million. On average, 79.3 percent of project costs were covered by the Bank.

AWM portfolio

3.2.3 ***Ghana:*** In Ghana, there were 9 AWM operations, consisting of seven projects and two studies. One study and three of the projects focussed on AWM (dedicated AWM). The others comprised a livestock project with minor AWM component, two rural development projects that included AWM, and an export and marketing project that included irrigation research and demonstration (see Annex 5). Only one of the projects was a large discrete scheme based on water from the Kpong dam on the Volta River. The other two dedicated AWM projects were both spread over a large geographical area as many small schemes.

3.2.4 ***Mali:*** The AWM portfolio in Mali included 16 operations, of which 10 were projects, 5 were studies, and one was a line of credit. Seven of the 10 were dedicated AWM projects (see Annex 4). All of these were discrete schemes along the Niger River; two were large schemes with total water control, designed for double cropping; one was aimed solely at increasing the area under traditional flood irrigation; and four combined both approaches but provided more flood than full water control. Of the two large scheme projects, one was gravity fed and the other supplied water by pumps. The smaller schemes in the mixed projects were all pump supplied.

CHAPTER 4. ASSESSMENT OF THE AWM PORTFOLIO PERFORMANCE IN GHANA AND MALI

4.1 Relevance and Quality at Entry

Relevance

The evaluation found that in terms of relevance, AWM projects in both Ghana and Mali were satisfactory. Projects were highly relevant to Government policy and the Bank's Country Strategy Paper (CSP). In both countries, the AWM projects were fully aligned to Government objectives and Bank strategy, as expressed in the relevant strategy papers. However, the Bank did not contribute to the strategic reflection at country level.

4.1.1 ***Mali:*** All AWM projects are in line with the National Priority Goals put forward in the growth and poverty reduction strategy (CSCR) and the *Schema Directeur du Developpement Rural*. They are also fully in concordance with the Bank's country strategy, as described in the CSP and the relevant strategy papers. The main aims of the strategy include improving food security and stabilising or increasing farm incomes for the rural population, and improving institutional support for farmers. The projects also reflect the priorities of the *Agriculture Irriguee: Orientations Strategiques et Perspectives de Developpement* (DNGR, 2008) and the *National Irrigation Development Strategy* (SNDI, 1999).

4.1.2 ***Ghana:*** The evolution of the Bank's AWM portfolio reflects the evolution of Government policy and the Bank's country strategy. The large-scale scheme, KIP, was designed to make use of the irrigation outlets from the Kpong dam in order to increase the irrigation efficiency of the defunct Ghasel irrigation area. At the time of KIP project inception, it was anticipated that substituting rice imports with local production through irrigation would contribute to the nation's economy. The smaller scheme, SSIDP, sought to develop smaller schemes where farmer management could be more easily introduced, reducing the burden on the State and increasing efficiency, following a 1986 World Bank study which was endorsed by Government. The Inland Valleys Rice Development Project (IVRDP) was also designed to be in line with the Government's sector-wide approach through the *Agricultural Services Sector Investment Programme* (AgSSIP).

4.1.3 ***In both countries***: AWM projects focused on large and medium-scale projects for which it would be hard for Government to find alternative funding sources. However, the Bank did not support the Government's strategic consideration of alternative options or approaches to AWM (e.g., rainwater harvesting, ground water extraction), through either ESW or policy dialogue. In the same vein, efforts to create an enabling environment for AWM development were limited.

Quality at entry

Quality at entry (QAE) was unsatisfactory for AWM projects. At the design phase, the projects were too optimistic about what results could be achieved, and how fast. Adequate consideration and assessment of risks and identification of mitigation possibilities were weak. The project designs lacked the flexibility to respond to change during implementation. The failure to learn from past projects; the long time delay between the study and the project; and in some cases, inadequate social and sub-soil investigations, inhibited the QAE.

4.1.4 Bank-supported projects in both countries were often preceded by studies. Although these were detailed and prolonged, they still proved inadequate for assuring QAE. One reason was the under-utilisation of the studies' results during project preparation and appraisal. In Mali, at Maninkoura, the pump inlets were set above water levels currently prevailing in the low water season, making double cropping impossible. The irrigated areas also included some areas with permeable soils, which were ill-suited to irrigation. As similar problems affected the first irrigation development at Selingue (1980 project), these could have been anticipated. The delays in implementing the Middle Bani Talo project, because of opposition of downstream riparian, indicate that insufficient information was given to the riparian population and their views were not considered before project launch. This opposition resulted in the need for more studies on the hydrology on the Bani river, which in turn led to substantial alteration of the design. At Ansongo, unidentified areas of rock just below the surface, and areas of loose and permeable substrate, meant that expensive and time-consuming extra works were required and that much of the planned infrastructure was never fully completed.

4.1.5 In Ghana, both KIP and SSIDP were preceded by detailed studies funded by the Bank and supported by international consultancy companies, carried out over several years. Still, the PCR for KIP identifies a lack of understanding of the project at entry as a possible cause of poor planning. For SSIDP, GIDA staff—despite being part of study team, found the studies preceding SSIDP to be deficient in sub-surface investigations, necessitating redesign of the schemes.

AWM targets often appear to have been overly optimistic.

4.1.6 In some cases, particularly in Mali, the long time lapse between the studies and project design (more than 15 years in some cases) may have been a factor in poor QAE. AWM targets frequently appear to have been overly optimistic, even where similar projects in the same country had shown important difficulties. This is the case even in the most recently appraised projects; in the case of NRGP (2008), the target of 4,500 hectares of small-scale irrigation and 410 dug-outs for livestock watering does not appear to reflect the reality of past experience of SSIDP, which achieved only 130 out of a target of 2,590 hectares; and of the Livestock Development Project (LDP), which is still struggling to complete 45 dug-outs after extension of the project. In addition, cost under-estimation appears to have prevented the completion of some work, and the abandonment of certain project components.

4.1.7 AWM activities appear particularly susceptible to unforeseen circumstances. The funding for contingencies should reflect this vulnerability. In addition, there may be cases where

a rapid response to site-specific problems is needed. However, this responsiveness was not built into either project designs or individual civil works contracts, and many activities continued as planned despite unforeseen problems. For instance, in the SSIDP development at New Longoro, steep banks at the start of the canal section needed emergency stone facing, in order to prevent damage to the canal. This was not in the civil works contract and the Bank refused to cover the extra cost. Such examples abound in both countries.

4.1.8 Lack of due consideration to assumptions and risks was a common failing. This was true in Ghana despite the detailed studies preceding KIP and SSIDP, which investigated potential problems and risks. The two more recent projects, the Northern Growth Development Program (NRGP) and Afram Plains, had a more rigorous assessment of the risks and mitigation measures to be taken. The older projects have a perfunctory consideration of assumptions. For KIP, the phrase used is 'all risks are covered', and for SSIDP, there are 'no major risks'. So nothing requiring monitoring and no possible mitigation was identified. In Mali, given the track record of slippage in implementation, appraisal documents were weak on measures to alleviate slippage and to document its possible effects on implementation costs and implementation plans. Many of the projects have suffered funding shortages due to the appreciation of the CFA franc against the UA since 2001. This eventuality, too, was not taken onto account at entry.

4.1.9 In both countries, recent improvements in project matrices have led to a more comprehensive treatment of risks. However, even in the most recent projects, there is a lack of discussion of the risk of delays and slippage, and of mitigation measures to be taken, despite past experience demonstrating that these are very real risks.

4.2 Achievement of Objectives (Efficacy)

Achievement of objectives was <u>unsatisfactory</u>. In many cases, AWM operations succeeded in delivering outputs, but failed in translating outputs into outcomes. The provision of basic AWM infrastructure was achieved, for the most part, but much of the infrastructure does not function as planned. Efficacy was decreased by shortfalls in implementation and the cancelling or reduction of other project components. Area targets for irrigation have fallen far short of expectations. In both countries, Government support to complete infrastructure after the projects end has markedly improved efficacy. However, other schemes have been left for a second phase, or seem likely to be left incomplete and un-utilised.

4.2.1 Goal-oriented project design and the quality of indicators have improved during the period, in line with Bank practice. Unfortunately, there has not been a corresponding increase in attention to M&E in measuring progress against these indicators. All of the projects planned to establish effective M&E, but none succeeded in doing so; attention to planning M&E improved, but little was implemented.

4.2.2 Globally, the efficacy of AWM projects in Ghana and Mali exhibited a mixed record. The achievement of physical outputs, as typically reported in the PCRs, could be considered moderately satisfactory, particularly in Mali. But in terms of outcomes, the efficacy was clearly

unsatisfactory. Shortfalls in implementation and the cancelling or reduction of project components reduced efficacy in both countries. These shortfalls reduced project benefits, and sometimes even left farmers worse off than if the project had not existed. This was the case at Antsonga in Mali, and may well become the case in the IVRDP in Ghana. If these situations are not reversed, the beneficiaries may have grounds for launching a formal complaint against the Bank. Many of the schemes were described as "90 percent completed," but from the point of view of potential users, this is the same as "0 percent." Environmental issues such as defining and restoring borrow areas were not clearly described in bid documents in either country, leaving contractors free to walk away from making good borrow and spoil areas.

4.2.3 ***In Mali***, efficacy was moderately satisfactory, and not all planned project outcomes were achieved. Most major infrastructure components were eventually completed, but other project facets were not completed, and some were abandoned completely. In some cases, infrastructure was completed but did not function as planned; for example, at Maninkoura, the water level in the Sakarani River is too low to supply the pumps during the off-season, so the planned double cropping is restricted. In general, accompanying measures such as health and education were completed, and had the valuable impact of maintaining beneficiary confidence when the main components were suffering delays. Project reporting was somewhat enigmatic. For instance, PCR for Talo referred to full cropping of the planned 4,750 hectares developed for flood rice farming, with an average yield of 3 tons/hectare and use of a large quantity of improved seed and fertiliser. However, apparently only 600 hectares have been fully developed under the project, and about 800 h have been developed by farmers without project assistance. At Maninkoura, the yields for the 900 hectare main crop and the 500 hectare off-season crop of rice were calculated using an average yield of 5 tons/hectare, which was too generous

4.2.4 All of the reviewed projects were multi-faceted, with additional activities connected to the major infrastructure, such as AWM support to livestock production and fisheries. However, these other facets were often sacrificed to enable the major infrastructure work to be completed. At Middle Bani and Talo, all livestock development work, including establishing large areas of bourgou and private sector veterinary services, was cancelled; and none of the proposed improvements to fish production was carried out. At Mopti (Rural Development Support Project of the Mopti Region, PADER) and Maninkoura, as well, livestock activities were considerably curtailed. There is a lack of data on the impact of these cancellations on the intended beneficiaries. However, the activities aimed at livestock farmers were supposed to have compensated them for the loss of seasonal grazing areas to more intensive cropping.

The other facets of the projects were sacrificed to enable completion of the major infrastructure.

4.2.5 ***In Ghana,*** efficacy is ***unsatisfactory***, due to severe delays in implementation, reduction in physical goals and cancellation of activities. The main problems stem from the civil works—namely, difficulty in procurement of contractors, poor performance of the contractors, and poor supervision of the contractors. KIP fell victim to numerous cancellations of appraised activities, including a reduction in the total area made ready for cultivation from 3,028 to 1,636 hectares; cancellation of the paddy drying floors and stores, water, and rural electrification sub-components; and drastic reductions in equipment and procurement. Subsequent investment by a

private company has transformed the fortunes of a project which, at completion, appeared to have failed. The rice area under command from the canal has been steadily increased, reaching around 2000 hectares in 2009. Most of this is now double cropped, with yields of around 5.5 tons/hectare, delivering total production estimated at 22,000 tons75 percent of the original target production level.

4.2.6 In SSIDP, the scheme in the Techiman area is complete except for the power lines to the electric pumps, and it remains unused. At New Longoro, the weir was built in 2003 and the canals were started. Field levelling and completion of the secondary canals have yet to be achieved, and the scheme is not yet in use. The implementing agency, GIDA, appears to have concentrated on delivering technically complex engineering works, rather than reducing the scope of schemes to allow them to be finished within the funds available. The project goal became the completion of elegant schemes as designed, rather than maximising the returns for farmers within the available budget. Despite cutting back the target from 4,000 to 2,500 hectares and then to 1,565 hectares, only 128 hectares are actually in use and disbursement has ceased.

4.2.7 IVRDP is being implemented by the CSD of MOFA. Twenty-five (25) inland valley sites covering a total of 4,500 hectares were to be developed, leading to an increase of 2,500 hectares over the 2,000 hectares currently cropped. By improving water control, yields were to be increased from 1.5 to 4.5 tons/hectare. An individual site was to be from 100 to 300 hectares, composed of many scattered valley bottoms of around 10 to 20 hectares each. Physical implementation has been difficult, with poor performance by the contractors. On the site visited by the team, the design had proved complex and delays in implementation led to houses being built in the area to be flooded.

4.3 Efficiency

Efficiency of AWM operation was found to be unsatisfactory. In general, beneficiaries appeared to have gained from the AWM investments, although not as much as projected. Shortfalls in implementation and the scaling back of project components reduced project benefits and in some isolated cases left farmers worse off than without project. Failures in civil works were the indirect cause of poor efficiency in both Ghana and Mali..

4.3.1 Most of the AWM projects in both countries calculated economic and/or financial rates of return at the time the projects were appraised. But since projects showed poor data collection and lack of attention to M&E, the efficiency of the investments cannot be evaluated in a satisfactory manner. The recalculation of these measures after the closure of the project is very difficult, due to non-availability of cost tables and lack of M&E. However, there were many aspects of design and implementation that either contributed to or reduced efficiency.

4.3.2 Delays at projects start-up and delayed implementation characterized most of the AWM projects. Delayed implementation, in the course of which currencies fluctuated, were an important factor in reducing efficiency in Mali. Difficulty in procurement was also a feature in both countries. Procurement in Ghana involved the implementing agencies using public

procurement processes; in Mali, the use of AGETIER (Self-financing organisation providing procurement and supervision services for civil works) may have enhanced procurement, although the final results were similar.

4.3.3 None of the projects in this evaluation completed all of its planned activities or achieved its development objectives, which led to reduced efficiency. In some cases, poorly designed intervention strategies probably reduced efficiency. For instance at Daye-Hamadja-Korioume in Mali, the irrigable area was extended even though water to the existing area was already in short supply. But efficiency of civil works implementation in both countries was reduced mainly by (i) difficult procurement processes; (ii) poor supervision of contractors; (iii) poor performance of contractors; (iv) slippage and delays; (v) contested contract variations between the Bank, the implementing agency, and contractors; (vi) the reduction or cancellation of other project components; and (vii) incomplete work at project finalisation.

4.3.4 Project performance evaluation reports (PPERs) were undertaken for the three closed projects (Annex 2). In Mali, the ex-post economic rate of return (ERR) for PMB was evaluated for an optimistic scenario at 9.8 percent. In comparison, the ERR at appraisal was 16 percent, and at completion 13 percent. In the same vein, the ERR for PAPIM, which was 12.7 percent at appraisal and 13 percent at completion, was recalculated at 7.4 percent.[2] The history of KIP in Ghana was different. The ERR moved from 13.1 percent at appraisal to a negative level at project completion in 2004; but rose to 14.2 percent by 2010. The financial rate of return (FRR) for KIP was not computed at appraisal or at PCR, but has been computed to be 16.5 percent at PPER. The entry of a private company has turned the fortune of this project.

4.4 Institutional Development Impact

The institutional development impact is rated satisfactory. The impact on institutional development was effective in Mali, but restricted to local management of the schemes, with limited comprehensive nationwide impact. In Ghana, the impact of AWM activities on institutional development was disappointing, partly due to government management of GIDA.

4.4.1 ***Mali:*** In Mali, localised positive impacts on institutions are evident, but there appears to have been no comprehensive nationwide impact on institutions in the sub-sector. The creation and support of stand-alone project management units (PMUs) was one reason for this. Almost all the projects were managed by semi-autonomous entities which had the ability to recruit personnel on the open market. This led to effective management. However, since these entities are heavily dependent on project funding, one might anticipate a tendency to keep projects going and plan for follow-on projects as a survival strategy. The impact of projects on institutional development was mainly limited to the immediate management unit. The National Offices of Rural Engineering (ONGR), the management unit in the Middle Bani, and the semi-autonomous

[2] This rate did not account for maintenance. The irrigation scheme at Manikoura was complex and the construction work was of poor quality, which certainly implies high maintenance costs. Data were not available on these costs.

offices of the Baguineda Irrigation Agency (OPIB), PADER, and ODRS (PAPIM), have undoubtedly benefitted greatly from the projects in terms of increased capacity—including buildings, office equipment, vehicles, and recruitment of high calibre staff. However, there has only been limited impact on the institutions charged with planning, implementing, and monitoring work in the AWM sub-sector at the national level.

4.4.2 ***Ghana:*** In Ghana by contrast, the main target for institution building was a national organisation, GIDA. The studies preceding KIP and SSIDP provided substantial capacity building for GIDA, with its staff working alongside international consultants. The impact of the capacity building provided under these studies and projects was disappointing, mostly because of poor management of GIDA by the government. The development of water users associations was restricted by the limited physical development of the schemes.

4.5 Sustainability

Sustainability refers to the likelihood that project results will be maintained over the intended project life. In both countries, sustainability was an area of greatest concern and was found to be unsatisfactory. Sustainability was constrained by technical and strategic issues, Government commitment, institutional and economic situations, and environmental settings.

4.5.1 ***Economic and financial sustainability is lacking,*** as the projects failed to introduce cost recovery. A number of issues impacted negatively on the financial sustainability of the projects. Obviously, where infrastructure is not working, or improperly working, coupled with farmers not able to practice a double cropping system for rice, it is difficult to charge farmers appropriate fees to recoup recurrent and eventual repair and replacement costs. So far this has been the case in both Ghana and Mali. In addition, there is a lack of economic sustainability at the farmer or household level if all recurrent water costs are included. Most of the schemes were aimed at rice production, a crop that does not have sufficient value to generate revenues necessary for farmers to be able to pay realistic water fees to support the huge overheads. By contrast, high-value production schemes such as the private banana farm at KIP, and the small-scale vegetable growers bucket irrigating from shallow wells (both of which were outside of the project), are economic and sustainable. However, land developed with flat plots and restricted drainage to achieve high yields of rice is not very suitable for other crops. Thus farmers are locked into rice production, which might be good for national targets of food self-sufficiency and import substitution, but which might not optimise farm income if other opportunities become available[3]. Where a government's aim is import substitution or national food security, it has to be prepared to shoulder a large proportion of the running costs in addition to the capital costs. This commitment should be built into the project design. The only projects where the question of water fees was discussed in detail at appraisal was SSIDP in Ghana, and more recently, the Markala sugar project in Mali.

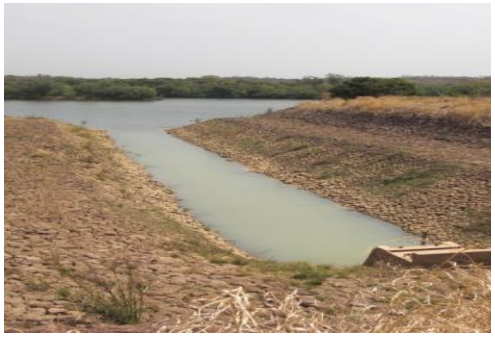
Farmers are locked into rice production, with might be good for food security, but is bad for sustainability.

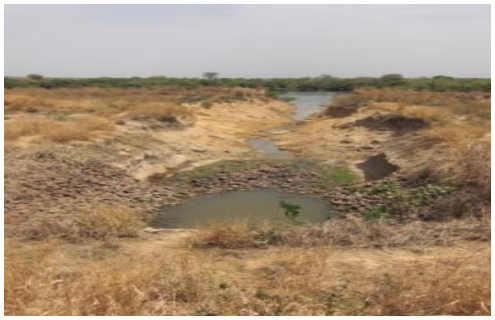
[3] If KIP had succeeded in developing all the land for rice production, Golden Exhotic would not have been able to establish its banana plantation.

4.5.2 ***Technical sustainability was also doubtful in some cases in both countries.*** Irrigation development costs were very high in these projects, although exact figures are difficult to determine, since project costs typically include many additional items and activities not strictly necessary for the schemes. In Mali, the cost of the Maninkoura project, estimated at about USD 18,000 per hectare (if part of the costs of the Kourouma sill are included), is well above the maximum level for economic viability of USD 5,000/hectare recommended by the World Bank. Nevertheless, the cost may not be high enough to ensure that work is of high quality and that equipment will function with minimal investment in maintenance over the project's expected life (20-25 years). At Maninkoura, after only two cropping seasons, some deterioration of the infrastructure was evident (Box 1). In both countries, initial design failings and cost over-runs resulted in schemes with limited sustainability.

Box 1. Deterioration at Manikoura

At Manikoura, deterioration was evident before the scheme became operational.





4.5.3 ***Environmental sustainability was not seriously considered in projects.*** Positive benefits have been noted on the aquatic ecosystem of the Middle Bani, which are likely to be sustained and increased by the planned sill at Djenne. The new project, the Bani and Selingue Basin Irrigation Development Programme (PDI-BS) is essential to the sustainability of the flood irrigation from Talo sill, as it will repair and protect the main canal, which is suffering severe erosion after only two seasons. However, the destabilisation of the river banks at Maninkoura poses a threat to sustainability of the scheme. In the same vein, climate change is not explicitly recognised in the project documents. For example, in Mali, it appears as if the contrast between the south, which may become wetter, and the north which may become drier, might increase. Forecasts for flood water levels, to make use of the sills, and for low-season water levels, to make use of the pumped schemes, do not appear to be available.

4.5.4 ***Sustainability depends on continuing government support.*** As noted above, sustainability of the schemes depends upon continued government funding and support. This support is not always balanced. For example in Ghana, KIP, a high-profile, large-scale scheme connected with the politically very sensitive area of the Akosombo dam and the Volta River Authority (VRA) has benefited from political interest and government support. The smaller schemes under SSIDP and IVRDP are out of the limelight and invisible except at a very local level. In SSIDP, only comparatively small additional investment is required to finish and put some of the schemes into use. In the case of IVRDP, where uncompleted schemes may have actually reduced the cropped area or yields, the farmers are mainly tenants or squatters (with no political power) and not the land owners.

4.6 Borrower and Bank Performance

Borrower performance

Borrower performance in both Ghana and Mali was <u>unsatisfactory</u>. Although there were examples of strong commitment by the borrower, there is evidence of insufficient local technical input during appraisal and negotiations to ensure realistic design. Supervision of contractors by the implementing agencies has been desultory, and neither Government took serious measures to enforce M&E and environmental monitoring in the projects.

4.6.1 In both Mali and Ghana, the Government and local institutions showed engagement, and there were many examples of the borrower increasing counterpart funding to permit the completion of schemes. But supervision and inputs to ensure realistic design were generally weak. During implementation, there was an absence of challenge to Bank views, and no evidence of a willingness to stop or suspend Bank funding to avoid further waste, or to allow time to develop institutions to a point where efficiency of implementation could be increased. Some of the problems which arose were reported to have been evident to local staff at entry. However, staff of the implementing agencies were not always in a position to suggest mitigation measures or alter costings to be more realistic.

4.6.2 ***<u>Mali:</u>*** In Mali, hydrological data are not readily available at the national level to help predict and plan for water availability, which is critical for pump irrigation schemes that depend on double cropping to be economically viable. This is particularly important, as the schemes may be competing for scarce low water flows of the Niger River. Reliable and accessible data are required to improve investment performance. At the project level, M&E was neglected, which affected tracking of implementation progress and of adaptive management measures. On an encouraging note, the M&E activities of DPS/MENOR *(Direction de la Planification et de la Statistique/*National Results Based External Monitoring) and of the *Rural Development Planning and Statistical Service* (CPS-SDR) have been extremely valuable. Establishment of this service demonstrates the Government's commitment to efficient use of development funding.

4.6.3 ***<u>Ghana:</u>*** The Government failed to provide adequate support and guidance to GIDA, the most important institution involved in the sub-sector. The board of GIDA was not in existence for much of the period under review. Terms and conditions for GIDA staff were not favourable to recruiting and retaining high-calibre staff. Supervision of contractors by the implementing agencies has been desultory, with apparent acceptance of delays and poor workmanship. Proactive management to ensure full completion of the schemes has been lacking. Also, the counterpart funding to which the Government committed was not forthcoming or arrived late, often with shortfalls. The Government took no serious measures to enforce M&E and environmental monitoring of the projects, although this has changed now with Afram Plains. On the positive side, it is to the Government's credit that creation of an enabling environment and commitment to KIP management has resulted in substantial development and a turnaround in the scheme's performance after the end of Bank involvement.

Bank performance

Bank performance was rated <u>unsatisfactory</u>. Diligence in procurement, and inflexible and cumbersome procedures, were major sources of implementation delays. In both countries, the Bank may have missed investment opportunities in AWM by reacting rather than contributing to the strategic reflection of the government. The role of the Bank in ensuring quality control for AWM infrastructure was minimal.

4.6.4 ***The Bank's role in ensuring QAE was weak.*** At the conception and design stages, it appears that all options were not considered. The failure to consider informal sector, peri-urban, and micro-scale groundwater abstraction that is 'below Government radar', may have led to the Bank and Government missing important investment areas in AWM. The Bank needs to act as a critical friend to government, challenging plans and assumptions, rather than taking projects and policies at face value.

4.6.5 In both countries, the Bank has financed a good number of studies to legitimize the projects that were eventually implemented. However, given the long time lapse between carrying out the studies and making use of them to prepare projects, the Bank ought to have at least revalidated the assumptions and adjusted the scale and scope of the project to the reality of what the project financing could comfortably support.

4.6.6 ***Bank supervision was not up to the task.*** Bank procurement rules are obviously necessary to ensure probity; nevertheless, more flexibility would have helped to ensure the quality and sustainably of completed civil works. Rapid decisionmaking was sometimes necessary to protect the existing investment or to finish work before a climatic outbreak On the other hand, there were many delays in seeking "no objection," which appear to be a symptom of unrealistic planning and underestimation of the time needed for due diligence in procurement and implementation. Moreover, the Bank did not take major steps to enforce quality control of infrastructure. The poor quality workmanship of some of the physical infrastructures reflects a deficiency in the supervision role of the Bank. It was an exception to find mission teams that had an appropriate skills mix (including irrigation specialists) during supervision missions, mid-term reviews, and PCRs.

4.6.7 ***Bank policy dialogue was encouraging.*** Prior to the establishment of the Field Offices, the Bank was, for the most part, not involved in policy dialogue. Recognition of this has led the Bank to play a more active role. In Mali, the Bank is spearheading a private-public partnership approach to developing irrigation with the Markala Sugar Project; and the new PDI-BS project is a model for multi-donor coordination in an integrated plan to improve existing schemes and increase the value of existing civil works. By contrast, in Ghana, prior to the opening of the Ghana Field Office, the Bank had not been considered active in the donor community. Even now, with the Field Office in place and Bank staff becoming members of the sector advisory group, the Bank's profile remains low. The composition of the Bank portfolio was apparently

little known and the Northern Region Growth Project (NRGP) was repeatedly referred to as ‘the IFAD project’, despite the Bank being the source of the larger portion of the co-financing.

CHAPTER 5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

The Bank and borrowers made little effort to explore options for AWM.

5.1.1 Infrastructure for AWM and associated institutions is a central element of the Bank's vision, which is being materialized in Ghana and Mali through large investments for surface water irrigation. However, the Bank's strategy in AWM at the country level is very much tied to Government thinking, without the Bank playing a role as a knowledge broker and contributing to identification of innovative or different approaches. The low quality of ESW and the limited involvement of the Bank in policy dialogue are factors constraining the Bank's strategic contribution to AWM. The same is true at project level, where limited or poor ESW is constraining the capacity of the Bank to question the assumptions and risks linked to the operation.

5.1.2 This limited strategic role played by the Bank is illustrated by the focus of many AWM operations on rice production. The countries' expectation is that the substitution of rice imports with local production will contribute to enhancing the nation's food security and to economic growth. However, irrigation development is still relatively very expensive in Africa, and rice is inherently a low- value crop compared to horticultural products and does not generate a very high income for small holders. Under irrigation, rice can be profitable only if it is doubled cropped and with appropriate cultivars. These conditions are generally not met in Bank projects. One of the consequences is that expected water fees are not covered by the additional income. In the longer term, developing the land as flat rice paddies, which cannot be readily drained to allow other higher-value crops, might reduce the income generating potential that a mixture of water provision and drainage might provide.

5.1.3 In Ghana, the transformation of a failed operation (KIP) into a success story through the use of infrastructure for a high-value crop by a private company illustrates the need for the Bank to have a more open and flexible approach on the finality of the infrastructure. The Bank is not yet sufficiently integrating into designs a consideration of the different opportunities that may arise for the private sector. Better identification of opportunities would require increased engagement with the private sector, as well as more consideration of the political and socio-ecological environment of the project. Lying behind the bricks and mortar is a complex set of relationships and interactions (institutional ecology) running far beyond the physical location of the works.

5.1.4 Poor M&E also limits the Bank's understanding of the economic, social, and ecological changes resulting from AWM interventions. Accordingly, the Bank does not have the adequate information to develop an effective long-term strategy. Although most AWM integrates M&E components, insufficient planning and funding of M&E at entry results in no or poor information being available. In some case, M&E is planned but no budget is allocated (Manikoura-Mali).

5.1.5 The Bank is the largest player in the sub-sector, but faces many challenges due to the multidimensional nature of AWM activities (civil works, institution building, agricultural

production, market access infrastructure, and so on). However, quality of infrastructure is central to the Bank's success in the AWM sub-sector. AWM projects are one-off projects that are site specific and time specific because of agro-climatic changes, and therefore they require high-quality, detailed design and civil works. Sufficient resources and effort must be invested to ensure the quality and timeliness of the studies. Another key feature of the Bank's design of AWM operations is the lack of realism, especially in relation to expected results, assessment of risks, time required for implementation, and cost recovery after project completion. This leads to cost overruns and cancellation of project components. It is critical that past experience should be better taken into account when defining objectives and deadlines, especially since the Bank's Agriculture Sector Strategy 2010-2014 calls for simpler projects, with fewer accompanying measures and components. Such projects would not have activities that could be sacrificed in order to complete the infrastructure when cost over-runs occur.

5.1.6 Another issue raised by this evaluation is the quality control and facilitation role played by the Bank during implementation. While the frequency of supervision seems reasonable, there are issues related to the quality of supervision. The responsibility for quality control of infrastructure should not only lie with the borrower and executing agencies of the various projects. In the same vein, the Bank's timeliness, simplicity and quality of reactions to procurement issues raised by borrowers are of concern.

5.1.7 The limited performance of AWM operations seems to have been exacerbated by a *second phase syndrome,* particularly in Mali. Projects staff are more concentrated on preparing a follow-on new project than on achieving a self-contained successful project. A feature of the Bank's portfolio in these countries is the long-term commitment to particular geographical locations, with second phase or follow-on projects to correct, finish, or enhance AWM being the norm. This approach militates against the search for local solutions or re-planning to improve outcomes during implementation. In addition, local staff of many AWM projects have developed a "survival strategy" consisting of trying to maintain project support by keeping projects going and planning for follow-on projects, to the detriment of the ongoing project. The existence of PMUs, whose staff are better paid than those in mainline civil service posts, is a factor in this problem, which is partly the cause of the slippages and delays in implementation.

5.1.8 Finally, the literature review clearly reveals that poor policy and institutions are still viewed as the main bottleneck in the agricultural water sector in Africa. This is confirmed by the experiences in Ghana and Mali, where the poor performance of the counterpart institutions was a major impediment to the success and sustainability of the projects. Strengthening the institutional capacities of RMCs will be key to ensuring sustainable and efficient management of the AWM infrastructure developed by the Bank.

5.2 Lessons Learned

From this evaluation, a certain number of lessons can be drawn for AWM in Ghana and Mali.

1) **AWM projects present particular challenges and therefore require very careful planning, design, and execution to avoid failures or leave the beneficiaries worse off.**

Those challenges include (i) *Irreversibility of AWM development:* with an AWM operation, land tenure patterns may be changed, topography altered, soils changed by levelling, and so on. If the anticipated benefits are not realised, the farmers cannot go back to their old practices and may be left permanently worse off. (ii) *Seasonal nature of the work*: during execution, a short delay in completing structures may mean that farmers miss an entire season's production, as it may be too late to plant by the time the scheme is functional. (iii) *Vulnerability of unfinished work:* unfinished AWM structures are often highly vulnerable to erosion or deposition. A delay leading to failure to complete the work during the working season may result in damage or destruction of the partly finished work during the rainy season; (iv) *Flexibility in execution:* AWM activities require a flexible approach. There are always critical unforeseen circumstances needing prompt responses during execution, and lack of flexibility or responsiveness is a major source of project failure. Such challenges need to be factored in at all stages of the project cycle.

2) **To be successful, AWM must change some aspects of the social and cultural structure.** For farmers to take advantage of the opportunities arising from irrigation development, changes in the farming system, access to land, or social organisation are often required. In Ghana and Mali, farmers had to develop new cooperative and competitive strategies and organisations (PMB-Mali, SSIDP-Ghana). An enabling environment to support these changes should exist, and AWM projects need to internalize the learning process that will lead to such changes.

3) **Success in introducing a complex change process is closely linked to the sequencing of project activities.** AWM projects typically have several intimately linked phases; the civil works are linked to training, formation of users associations, provision of inputs and credit. Delays in the civil works, if the activities run concurrently, may mean that the entire budget for training, for example, is used before the civil works become available. In addition, the beneficiaries may not be fully committed because they lack confidence that the schemes will ever be finished. If the other activities are delayed until completion of the civil works, the project may end before the activities are started (as was the case with many projects in both countries).

5.3 Recommendations

In order to improve Bank effectiveness in the AWM sector in Ghana and Mali, this report recommends the following:

1) **The Bank must invest more resources in high-quality, timely and relevant ESW to contribute to strategic reflection at country level and to improve the quality of its AWM projects.** The Bank should be more creative in developing country strategies, informing government policy, acting as a critical friend, and keeping abreast of research and innovation in the sector. Key technical and socio-economic issues to be addressed include soil mapping and hydrological surveys, the economics of rained versus irrigated farming, the choice between large versus small irrigation perimeters, responsibilities for management of irrigation land, and the role of large private firms versus small holders. At the project level, sufficient resources should be invested in feasibility studies to provide a broad assessment of

risks and opportunities, and to ensure an understanding of the change process required for the project to yield optimal benefits.

2) **The Bank should engage more with a range of stakeholders, including authorities, donors, the private sector, and small holders, at both national and local levels, to ensure that the enabling environment exists for benefits of its operations to be fully realized.** Issues such as settlement of land tenure problems around AWM, development of water user groups, and engagement of the private sector should be some of the key issues at the center of the dialogue and engagement. The Bank's exit strategy should be developed at the outset of the project, in close collaboration with the different stakeholders, to encourage them to take over when Bank support ends. With the new Bank Agriculture Sector Strategy, future AWM projects will only focus on infrastructure, and other components will be carried out by other partners. The ability of the Bank to identify strategic partners will be crucial from that perspective.

3) **The Bank should increase its focus on policy and institutions, and strengthen internal management capacity of AWM-related bodies.** The Agriculture Sector policy recognizes that the main challenge facing the AWM is the weak institutional capacity to carry out operations in management and maintenance of installed irrigation structures. The capacity development needs for AWM should also go beyond individuals to encompass the wider issues of organizations within which the individuals work and the social and economic environment within which organizations and individuals function.

4) **The Bank needs to be more realistic about expected results, the time required for implementation, and the conditions necessary for sustainability of its AWM operations.** This would require factoring in the experience of previous operations when defining expected results and an implementation timetable. As for sustainability of AWM interventions, the Bank should not only focus on cost recovery issues, but also reconsider the rationale behind AWM projects, including the choice of rice as the target crop in most AWM interventions.

5) **The Bank needs to improve its quality control and facilitation roles to ensure smooth and high-quality implementation of the operations.** In particular, the Bank should undertake adequate capacity assessment at project inception and ensure appropriate and timely training on procedures, of relevant country officials. More flexibility and responsiveness need to be built into project design and/or into the individual civil works contracts. The Bank should improve supervision missions in terms of composition and duration, which implies recruiting more specialized staff and/or make more use of Field Offices.

6) **The Bank should pay more attention to M&E and incorporate lessons into projects design.** This includes better documentation of projects and data collection. In line with the recent evaluation of project supervision, the SAP system should be redesigned to improve the reliability of supervision data, and make M&E information a resource for use by both the Bank and borrower. The Bank should consider supporting the development of in-country M&E capacity and medium to long-term master plans for irrigation development.

ANNEXES

Annex 1

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Annex 2

List of Reports Produced in the Course of this Evaluation

Literature Review
1. Agricultural Water Management in Africa: Local Challenges in a Global Context
Portfolio Review
2. Portfolio Review of Bank Agricultural Water Management Operations, 1990-2007
Project Performance Evaluation Report
3. Project Performance Evaluation Report (PPER) of the "Kpong Irrigation Project (KIP) - Ghana"
4. Project Performance Evaluation Report (PPER) of the "Périmètre Irrigue du Moyen-Bani (PMB) - Mali"
5. Project Performance Evaluation Report (PPER) of the "Projet d'Aménagement du Périmètre Irrigué de Manikoura (PAPIM) - Mali"
Country Sub-sector Review
6. Review of the Agricultural Water Management Sub-sector in Ghana
7. Review of the Agricultural Water Management Sub-sector in Mali
Working Paper
8. Lasting Forever: Why Some Development Operations Delay So Much While Others Do Not?

Annex 3

AWM Sub-sector Contexts in Ghana and Mali

Institutions and legal framework

Ghana: In Ghana, the Water Resources Commission (WRC) has overall responsibility for the management of water resources. The 1996 Water Act defined its responsibilities as (i) processing of water rights and permits; (ii) planning for water resources development and management, with river basins (catchments) as the natural units of planning; (iii) collating, storing, and disseminating data and information on water resources in Ghana; and (iv) monitoring and assessing activities and programmes for the utilisation and conservation of water resources. According to the National Irrigation Policy, Strategy and Regulatory Measures (published in 2007), there are three categories of irrigation in the country: formal, informal, and commercial. Formal irrigation is made up of some 22 irrigation schemes which are managed by the GIDA, an autonomous body developed from the equivalent of DNGR within the Ministry of Food and Agriculture. GIDA is also responsible for the designing and engineering of water schemes. Micro-scale schemes and extension are the responsibility of the Crop Services Division (CSD) of MOFA. The implementing agency for two of the three Ghana AWM projects was GIDA, while CSD/MOFA was responsible for the third. Informal irrigation is made up of irrigation practiced by individuals who cultivate small land holdings of 0.5 hectares or more using simple structures. Commercial irrigation comprises large-scale irrigators who have either develop their own irrigation infrastructure (e.g. , Jay River Farms) or lease abandoned or undeveloped portions of some formal irrigation schemes (e.g., Golden Exotic at KIP).

Mali: In Mali, water use in the Niger Basin is regulated by a committee chaired by the *Direction Nationale de l'Hydraulique* (DHN), with the aim of maximising water use efficiency. The National Rural Engineering Service (DNGR), part of the Ministry of Agriculture, is responsible for designing and engineering water schemes. However, autonomous local Offices, which can raise their own funds in addition to receiving state funding, actually carry out this role. This meant that all of the reviewed projects were administered locally rather than by a centralised body. The legal framework for access to land and water use is laid down in the *Code Domanial et Foncier du 22 mars 2000* and the *Code de l'Eau du 31 janvier 2002*. However, neither of these texts appears to have been actively disseminated or their provisions fully implemented. Access to land and water is regulated by traditional practices, except in the larger schemes, where ownership is vested in the Office responsible for managing the scheme and farmers pay for yearly or seasonal access through water fees. National strategies reflect the hydrology of the period in which they were written. For example, the *Agriculture Irriguee: Orientations Strategiques et Perspectives de Developpement*, produced by DNGR in 2008, considers the more efficient use of the annual flood through the sills at Talo and Djenne, along with small-scale village systems, to be very important. To maximise the return on full water control schemes, the maximum area that can be irrigated from the Niger in the off season, when water levels are low, is 40,000 hectares, so this strategy gives priority to high-value crops and those with low water demand. It also focuses on integrated water use throughout the basin. On the other hand, the National Irrigation Development Strategy (SNDI, 1999), developed after a period of dry years, gives priority to schemes with total water control.

Physical resources and current utilisation

Ghana: In Ghana annual renewable water availability is estimated at 53km^3 of which 30km^3 is from local rainfall and 23km^3 inflows from neighbouring countries, mainly Burkina Faso and Togo. Availability per person is about 2,500m^3 which is about half the average for Africa. Water storage is estimated at 165,500km^3 most of which is in the Volta Lake behind the Akosombo dam. Water availability, even drinking water, is a problem during the dry season in the North of the country. Water management for agriculture exists since time immemorial, using valley bottoms for rice and horticultural crops, but the development of formal irrigation and water for livestock is comparatively recent, only dating from the 1960s. The Volta dam was constructed from 1961-65 primarily for hydro-electric power but the Volta River Authority (VRA) opened a 1,000ha irrigated farm below the dam. Several large, donor funded schemes, with the civil works undertaken by international firms under the guidance of GIDA, were opened in the 1970's, notably Tono and Vea totalling more than 3,000 hectare. By 2003, about 9,000ha on 22 schemes had been developed; this also includes those run by ICOUR and other bodies outside of GIDA. Six of these were reported as having been already abandoned in 2003, leaving a net irrigated area of 5,200ha. A further 10,000ha have been developed on private schemes with intensive production of high value crops or forage production linked to high value animal products.

The land available for large scale schemes is limited and farmers' acceptance of the sequestration of their land is uncertain. This has encouraged the development of smaller scale schemes on land negotiated or bought from land owners, or in the case of the north of the country from the trustees, land priests and chiefs, who hold the land in trust for the population. With the building of the Akosombo dam, and Kpong weir, the flood regime of the lower Volta River was regulated. Fertile land in the flood plain became available for year round farming; it is on this land that the KIP was developed. In the upper section of the Volta River in Ghana, settlement near the river was limited by river blindness. Because high water flows coincided with the rainy season, farmers traditionally preferred to grow rainfed crops on the higher land. The risks of crop loss by flooding on the flood plains are higher than that of drought on the rain-fed land. Away from the Niger and Volta rivers, Ghana has many more perennial streams, so small scale irrigation from surface water using diversion weirs has much more potential. The north of Ghana with only seasonal flows requires more complex and expensive storage structures, so groundwater extraction may be more cost effective. The potential area which could be irrigated is estimated to be between 0.35 to 1.9 million hectare, the wide range of figures from different studies indicates uncertainty over the area available in small to medium size pockets in the inland valleys which form the bulk of the total. The area with some sort of AWM was estimated at about 30,000 hectare in 2000, but much of this was in informal, small and micro scale systems consisting of earth bunds and shallow wells. These are found in rice producing inland valleys and peri-urban vegetable producing areas.

Mali: In Mali, despite the generally dry climate, there are abundant water resources because of the rivers Niger and Senegal and their effluents draining the Guinea highlands. Water quality is good and the sediment load low, as the drainage is from densely forested areas with little soil erosion. Annual renewable water availability, after subtracting evapo-transpiration, is estimated at 7,500 m^3 per person, of which 40 percent is from rainfall within Mali and 60 percent from the large rivers entering the country. Water storage is very limited, with 2.17 km^3 stored by the Selingue dam on the Niger system, and 11.27 km^3 stored by the Manantali dam on the Senegal

River. The river is shared by Mali, Senegal, and Mauritania, and has a minimum guaranteed flow of 200 m^3/sec where it leaves Mali.

A vast area of 2.2 million hectares is estimated to have suitable soils for irrigation. However, the actual potential for irrigation is much lower; there is more land available than there is water to irrigate it, particularly during low river flows. At present, about 600,000 hectares are irrigated, mainly with flood water, of which some 300,000 hectares have some form of water control. Of the latter, 60,000 hectares are no longer cropped due to the reduced level of the Niger floods and/or to decrepit infrastructure. Traditional irrigation—managing the flood waters—has been used for centuries and is well understood, but community capacity for managing and maintaining modern irrigation systems is very limited. Large areas of land were developed or earmarked for irrigation projects along the Niger River during the colonial period. These are the main areas which current AWM projects seek to rehabilitate or develop.

About 92,000 hectares are now under full water control. Of these, more than 60 percent are under the *Office du Niger*, with 54,000 hectares of rice and 6,000 hectares of sugar cane fed by gravity irrigation from the Markala dam, which has a capacity to deliver up to 120 m^3/sec. Other large-scale schemes, such as those at Banguineda and Selingue, total about 11,000 hectares, with medium-scale schemes (100-1000 hectares) making up a further 2,000 hectares. Small-scale (less than 100 hectares) community and private schemes, mainly along the Niger and Senegal rivers, total 23,000 hectares. There are ambitious plans to increase irrigation. A report prepared with the help of UNCTAD in May 2009 laid out plans for an additional 100,000 hectares under gravity irrigation under the *Office du Niger* by 2015, to enable regular rice exports to neighbouring countries. The Millennium Challenge Corporation is currently developing 16,000 hectares at Alatona on the Sahel Canal north of the Niger River by extending the canal by 23 km and building a new 63 km canal using water from the Niger taken at the Markala dam.

The main source of irrigation water in Mali, except for the extreme south, is the Niger River and its effluents. The Volta River is not so dominant in Ghana, which has several large rivers flowing in the south of the country. The seasonal flood regime of these rivers brings abundant water; conversely, low season flows are very limited. Water storage in the Niger Basin is very limited; the storage behind the Selingue dam is only sufficient to maintain the minimum agreed flow in the Niger where it leaves Mali, with little potential for increasing year-round irrigation. However, in Ghana, the Volta Lake stores several years of flow of the Volta River. Discharge is regulated to maximise hydroelectric power, but remains rather stable, allowing certainty over water availability at off-take structures. There is water availability to greatly increase year-round irrigated farming below the dams.

Although both countries have inland valleys, the way in which they are used is different. In the south of Mali, where the valleys have been developed for rainy season rice, they are farmed by local people as part of their integrated farming system. Limited areas are also cropped with higher-value crops in the dry season. The system in the north of Ghana is similar, but the degree of development and pressure on the inland valleys is much less. These valleys are mainly used for dry season grazing by herds. In the south of Ghana, with bi-modal rainfall, the farming system focus has been on high-value tree crops and rain-fed maize and cassava in upland areas. The year-round availability of water permits the growing of higher- value crops as well as rice, where soil conditions are suitable.

Annex 4

Bank Operations in Mali with an AWM Component 1990-2007

Operation Name	Status as of Dec-2007	Operation type	Approval Year	Planed final date	Total project cost (UAC)	Bank share	Dedicated water
MOPTI REGION RURAL DEVELOPMENT SUPPORT PROJECTI	Ongoing	Project	Oct-01	Dec-09	18,010 m	85%	Dedicated
MOYEN BANI PLAINS DEVELOPMENT PROJECT (I)	Ongoing	Project	Dec-97	Jun-08	27,340 m	74%	Dedicated
DAYE-HAMADJA-KORIOUME SCHEMES CONSOLIDATION	Ongoing	Project	Nov-00	Jun-09	11,000 m	85%	Dedicated
LINE OF CREDIT TO BNDA	Ongoing	Line of Credit	Dec-02	Dec-08	47,300 m	32%	No
SEED SECTOR SUPPORT PROJECT	Ongoing	Project	Jun-01	Dec-08	6,040 m	87%	No
MANINKOURA IRRIGATION DEVELOPMENT PROJECT	Completed	Project	Oct-00	Mar-08	15,360 m	84%	Dedicated
PHÉDIE IRRIGATION DEVELOPMENT STUDY	Completed	Study	Apr-02	Aug-06	673,428	93%	Dedicated
MALI DOUENTZA IRRIGATION STUDY	Completed	Study	Sep-01	Jun-06	690,299	94%	Dedicated
DJENNE DISTRICT DEVELOPMENT STUDY	Ongoing	Study	May-04	Jun-08	1,132 m	94%	Dedicated
BAGUINÉDA INTENSIFICATION PROJECT	Ongoing	Project	Nov-05	Dec-11	17,080 m	87%	Dedicated
NORTH-EAST LIVESTOOCK DEVELOPMENT SUPPORT	Ongoing	Project	Sep-02	Dec-09	17,459 m	79%	No
ANSONGO DISTRICT RURAL DEVELOPMENT PROJECT	Ongoing	Project	Oct-99	Dec-08	10,820 m	87%	Dedicated
WATER STUDIES	Completed	Study	May-98	Dec-04	700,000	100%	Dedicated
INVASIVE AQUATIC WEEDS – MALI	Ongoing	Project	Sep-04	Dec-11	1,580 m	82%	Dedicated
SOUTH MALI RURAL DEVELOPMENT II	Closed	Project	May-92	Sept-02	12,140 m	82%	No
BAGUINEDA II PROJECT STUDY	Closed	Study	Sept-98	Dec-04	753,450	94%	Dedicated

Annex 5

Bank Operations in Ghana with an AWM Component, 1990-2007

Operation Name	Status as of Dec-2007	Implementing Agency	Operation type	Approval Year	Planned final date	Actual completion date	Total project cost (UAC)	Bank share	Dedicated water
KPONG IRRIGATION PROJECT	Closed	GIDA	Project	1990	2003	2006	36,038 m	0.70	Yes
SMALL-SCALE IRRIGATION DEVELOPMENT PROJECT STUDY	Completed	GIDA	Study	1992	1994	2011	2,520 m	0.79	Yes
SMALL-SCALE IRRIGATION DEVELOPMENT PROJECT	Completed	GIDA	Project	1997	2003 late start 2000 so became 2005	2009	22,460 m	0.67	Yes
AFRAM PLAINS DEVELOPMENT STUDY	Completed	MOFA	Study	2000	2006		664,913	0.93	No
LIVESTOCK DEVELOPMENT PROJECT	Ongoing	MOFA	Project	2001	2008	2009	22,070 m	0.89	No
INLAND VALLEY RICE DEVELOPMENT PROJECT	Ongoing	MOFA CSD Kumasi PMU as for Food crops	Project	2001	2008		17,094.8m	0.88	Yes
EXPORT MARKETING AND QUALITY AWARENESS PROJECT	Ongoing	MOFA HEII	Project	2005	2011	N/A	18,840 m	0.94	No
AFRAM PLAINS RURAL DEVELOPMENT PROJECT	Ongoing	MOFA (PMU at decentral. level)	Project	2006	2012	N/A	22,450 m	0.89	No
NORTHERN RURAL GROWTH PROGRAM	Approved	MOFA	Project	2007	2015	N/A	68,385 m	0.58	No

Annex 6

Individual Project Ratings

Individual Project Scores for Dedicated AWM Projects in Mali

Ansongo District Rural Development Project (PRODECA)

	Score	Notes
Relevancy	2	Fitted with development priorities, but poorly designed
Efficacy	1	Infrastructure not completed
Efficiency	1	Slippage and losses by farmers
Institutional impact	1	Little
Sustainability	1.25	Political support, but not much else
Overall	1.25	

Baguinéda Irrigation Intensification Project

	Score	Notes
Relevancy	3	Fits all objectives
Efficacy	3	Should be completed
Efficiency	1	Slippage and losses by farmers
Institutional impact	3	OPIB reinforced
Sustainability	2	Secondary canals?
Overall	2.4	

Maninkoura Irrigation Development Project (PAPIM)

	Score	Notes
Relevancy	2.5	Aligned with policies, but flawed studies/design
Efficacy	2	Finished, some activities dropped
Efficiency	2	Slippage, off-season problem
Institutional impact	2	Good locally but no national impact
Sustainability	2.25	Threat of erosion, otherwise good
Overall	2.15	

Moyen Bani Development Programme (Phase 1)

	Score	Notes
Relevancy	2.4	Aligned with policies, but not very unrealistic objectives
Efficacy	1.8	Reduction or cancellation of project components
Efficiency	1.8	Slippage and uncompleted work
Institutional impact	2	Good locally but no national impact
Sustainability	2.1	Erosion problems and positive aquatic benefits
Overall	2	

Mopti Region Rural Development Support Project (PADER)

	Score	Notes
Relevancy	2.75	Beneficiary involvement poor
Efficacy	2.4	Achieving results
Efficiency	1.6	Slippage
Institutional impact	2	Only at local level
Sustainability	2.5	Climate change and river levels?
Overall	2.25	

Daye Hamadja and Korioume Plains Rural Development Support Project

	Score	Notes
Relevancy	2.9	Fitted policies, but not very unrealistic objectives
Efficacy	1.8	Reduction or cancellation of project components
Efficiency	1	Slippage and unnecessary activities performed
Institutional impact	1.5	Management issues are a cause for concern
Sustainability	1.75	Serious maintenance problems
Overall	1.79	

Invasive Aquatic Weeds-Mali : Multinational project covering eight countries and implemented by ECOWAS secretariat in Abuja; not evaluated.

Individual Project Scores for Dedicated AWM projects in Ghana

Kpong Irrigation Project (KIP)

	Score	Notes
Relevancy	2	Despite detailed studies, PCR reports that the results not widely disseminated or understood
Efficacy	1 became 3	Low at PCR, but subsequent irrigation development favorable, other components cancelled or reduced
Efficiency	1	Slippages and delays, project left unfinished
Institutional impact	1 became 2	PCR reports this as low, but current KIP management apparently very successful
Sustainability	1 became 3	With further public and large private sector investment, the low sustainability reported in PCR has been reversed
Overall	2.2	

Small-scale Irrigation Development Project (SSIDP)

	Score	Notes
Relevancy	2	Consideration of risks poor, otherwise would be 3
Efficacy	1	Reductions in target area and number of sites, most projects unfinished and unusable
Efficiency	1	Slippage and delays
Institutional impact	1	GIDA is apparently no stronger than before project
Sustainability	1	Schemes deteriorating before being used, water users associations folding because schemes still unfinished
Overall	1.2	

Inland Valley Rice Development Project (IVRDP)

	Score	Notes
Relevancy	2	Delays in starting civil works due to the need to survey and plan sites not included in planning; unrealistic targets
Efficacy	1	Reductions in target area and number of sites; poor work might leave farmers worse off than without project
Efficiency	1	Slippages and delays and poor work
Institutional impact	2	CSD of MOFA now understands the problems of developing small scale irrigation
Sustainability	1	No time to develop water user associations before the end of project life, physical sustainability doubtful due to poor work by contractors
Overall	1.2	