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The World Bank

Report No: ICR00001533

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF-054250)

ON A

GRANT

IN THE AMOUNT OF US$4.1 MILLION

TO THE

REPUBLIC OF KENYA

FOR A

WESTERN KENYA INTEGRATED ECOSYSTEM MANAGEMENT PROJECT

December 21, 2010

Environmental and Natural Resources Management Unit
Sustainable Development Department
Country Department AFCE2
Africa Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective December 15, 2010)

Currency Unit = Kenyan Shillings (KES)
KES 80.60 = US$1

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

ATIRI	Agricultural Technology and Information Response Initiative	KFS	Kenya Forest Service
		LRNP	Legume Research Network Project
BTC	Basin Technical Committee	LVEMP	Lake Victoria Environment Management Project
CAS	Country Assistance Strategy		
CBO	Community-Based Organization	M&E	Monitoring and Evaluation
CDF	Constituency Development Fund	MIS	Management Information System
CPS	Country Partnership Strategy	MTP	Medium-Term Plan
CSO	Community Service Organization	MTR	Mid-Term Review
ESIA	Environmental and Social Impact Assessment	NGO	Non-Governmental Organization
EMP	Environmental Management Plan	NPV	Net Present Value
ERR	Economic Rate of Return	NRM	Natural Resource Management
FGD	Focus Group Discussion	OP	Operational Policy
FM	Financial Management	PAD	Project Appraisal Document
FMR	Financial Monitoring Report	PAP	Participatory Action Plan
GEF	Global Environment Facility	PCO	Project Coordination Office
GEO	Global Environmental Objective	PDO	Project Development Objective
GoK	Government of Kenya	PHRD	Policy and Human Resources Development
GHG	Greenhouse Gas	QAG	Quality Assurance Group
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome	SIDA	Swedish International Development Cooperation Agency
		SLM	Sustainable Land Management
ICR	Implementation Completion and Results Report	SMP	Soil Management Project
ICRAF	World Agroforestry Center	SOE	Statement of Expenditure
IEM	Integrated Ecosystem Management	SRR	Social Rate of Return
IFR	Interim Unaudited Financial Report	TAG	Technical Advisory Group
KARI	Kenya Agricultural Research Institute	US$	United State Dollar
KES	Kenyan Shilling	WRMA	Water Resource Management Authority

Vice President:	Obiageli K. Ezekwesili
Country Director:	Johannes C. M. Zutt
Sector Manager:	Idah Pswarayi-Riddihough
Project Team Leader:	Christian Peter
ICR Team Leader:	Christian Peter
ICR Primary Author:	Junko Nishikawa

REPUBLIC OF KENYA
WESTERN KENYA INTEGRATED ECOSYSTEM MANAGEMENT PROJECT

Contents

A. Basic Information			
Country:	Kenya	Project Name:	KE-GEF W KE Int Ecosys Mgmt SIL (FY05)
Project ID:	P072981	L/C/TF Number(s):	TF-54250
ICR Date:	05/17/2010	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	GOVERNMENT OF KENYA
Original Total Commitment:	US$4.1M	Disbursed Amount:	US$3.8M
Revised Amount:	US$4.1M		
Environmental Category: B		**Global Focal Area: M**	
Implementing Agencies: Kenya Agricultural Research Institute			
Cofinanciers and Other External Partners: World Agroforestry Center			

B. Key Dates				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	09/23/2003	Effectiveness:	07/13/2005	07/13/2005
Appraisal:	06/11/2004	Restructuring(s):	03/04/2010	03/04/2010
Approval:	03/01/2005	Mid-term Review:	01/14/2008	06/02/2008
		Closing:	06/30/2010	06/30/2010

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Moderately Satisfactory
Risk to Global Environment Outcome	Substantial
Bank Performance:	Moderately Satisfactory
Borrower Performance:	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance			
Bank	**Ratings**	**Borrower**	**Ratings**
Quality at Entry:	Moderately Unsatisfactory	Government:	Moderately Unsatisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance:	Moderately Satisfactory	Overall Borrower Performance:	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	Moderately Unsatisfactory
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
GEO rating before Closing/Inactive status	Moderately Satisfactory		

D. Sector and Theme Codes		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Agricultural extension and research	15	20
Central government administration	3	10
General agriculture, fishing and forestry sector	67	55
Other social services	5	5
Sub-national government administration	10	10
Theme Code (as % of total Bank financing)		
Biodiversity	33	8
Climate change	17	12
Environmental policies and institutions	17	17
Other rural development	16	35
Participation and civic engagement	17	28

E. Bank Staff		
Positions	**At ICR**	**At Approval**
Vice President:	Obiageli Katryn Ezekwesili	Gobind T. Nankani
Country Director:	Johannes C.M. Zutt	Makhtar Diop
Sector Manager:	Idah Z. Pswarayi-Riddihough	Karen Brooks
Project Team Leader:	Christian Peter	Berhane Manna
ICR Team Leader:	Christian Peter	
ICR Primary Author:	Junko Nishikawa	

F. Results Framework Analysis

Project Development Objective (PDO), Global Environment Objectives (GEO) and Key Indicators (as approved)

The Project Development Objective is to improve the productivity and sustainability of land use systems in selected watersheds in the Nzoia, Yala, and Nyando river basins through adoption of an integrated ecosystem management approach.

The Global Environmental Objective is to promote a set of integrated ecosystem management interventions so as to achieve local and global benefits. These benefits include reduced land degradation, reduced greenhouse gas accumulation in the atmosphere, improved on- and off-farm biodiversity, and decreased erosion in watersheds that feed into the Nyando, Yala, and Nzoia river basins.

Revised Global Environment Objectives (as approved by original approving authority) and Key Indicators and reasons/justifications

The Mid-Term Review (MTR) held in June 2008 and subsequent restructuring at Country Director level (level 2 restructuring) addressed the ambitiousness of the Project design and original targets, resulting in the revision of performance indicators and redefinition of Project intervention areas (see Section 1.3). The original logframe was replaced by a results framework, leaving the original PDO and GEO unchanged. The original and revised indicators are shown in Annex 2.

Reasons for the revision were to enable performance monitoring of the Project objectives in a more direct and effective manner, given that some of the original indicators (e.g., negative trends in erosion rates and phosphorous runoff, and above- and below-ground carbon sequestration monitored and assessed) were overly ambitious, difficult to measure, or had little or no systematic linkage to the outputs and outcomes in the existing results chain. With this in mind, several of the original indicators were replaced by more realistic and measurable ones with quantitative target values, including those for the PDO and GEO, taking the available baseline data into account.

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Decreased number of food-deficit months per annum			
Value (percentage)	75 (equivalent to 9 months)	No target value set	60 (equivalent to 7.2 months)	36 (equivalent to 4.3 months)
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	This indicator was newly introduced after the MTR. The impact assessment study at project completion reported approx. 5 months of shortage of both maize and meat. Maize shortage months decreased from 5.3 to 4.3 months in beneficiary households while non-Project participants reported an increase of food-deficit months between 2004 and 2009.			
Indicator 2:	Percentage of households in Project intervention areas that are satisfied with Project interventions			
Value (percentage)	65	No target value set	90	90
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	About 90% of the households were satisfied with Project interventions as per adoption/stakeholder satisfaction studies conducted from November 2008 to February 2009			
Indicator 3:	Number of direct Project beneficiaries (% of which are women)			
Value (number)	16,000 (50% women)	No target value set	24,000 (50% women)	40,000 (70% women)
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	Target exceeded.			

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Area reforested for carbon sequestration			
Value (ha)	560	Sequestration of 3.3 C tons/ha	1,200	1,820
Date achieved	06/06/2008	03/01/2005	03/04/2010	06/30/2010
Comments	Estimated based on 2.6 million tree seedlings planted with 70% survival rate, assuming 1,000 seedlings population per hectare.			
Indicator 2:	Decreased incidence of soil erosion in Project intervention areas			
Value (percentage)	60	Negative trend in erosion rates	45	45
Date achieved	06/06/2008	03/01/2005	03/04/2010	06/30/2010
Comments	The baseline value is based on the number of clusters within micro-catchments observed to be erosion prone at the time of the baseline biophysical inventory in 2006. Actual value is based on the observed incidences of erosion within micro-catchment clusters after the construction of soil and water conservation structures through Project activities.			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Component 1: Capacity Building for Community Driven Integrated Ecosystem Management				
Indicator 1:	Number of community participatory action plans (PAPs) developed at micro-catchment level			
Value (number)	11	No target value set	15	15
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments				
Indicator 2:	Community participation in assessment planning, decision making, implementation, and evaluation of Integrated Ecosystem Management (IEM) activities			
Value (percentage of target households)	75	50	90	90
Date achieved	06/06/2008	03/01/2005	03/04/2010	06/30/2010
Comments	This figure refers to the percentage of target households with whom the Project directly engaged. The original target was exceeded.			
Indicator 3:	Participation of local and regional institutions in planning and coordinating ecosystem management activities			
Value (percentage of indentified relevant stakeholder)	75	90	95	95
Date achieved	06/06/2008	03/01/2005	03/04/2010	06/30/2010
Comments	95% of the government departments, NGOs, CBOs and other relevant institutions within the Project intervention areas participated, thus exceeding the original target.			
Indicator 4:	Number of Project ideas on carbon finance developed in Project intervention areas			
Value (percentage)	0	No target value set	1	1
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	This indicator was newly introduced after the MTR. Target met.			
Component 2: Scaling up and Financing IEM Interventions				
Indicator 5:	Percentage of PAPs implemented according to planned schedule			
Value (percentage)	40	No target value set	70	82
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	Target exceeded.			
Indicator 6:	Hectares of land brought under SLM interventions			
Value (ha)	560	No target value set	1,200	2,200
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	The figures show the area where planted trees and crops survive based on periodic (bi-annual) survival rate counts. Target exceeded.			

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Component 3: Establishing a Monitoring & Evaluation System				
Indicator 7:	Methodology for carbon and other GHG emission measurement developed and baseline available			
Value	No methodology available	No target value set	Complete	Complete
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	Target met.			
Indicator 8:	Number of experts in participating institutions with capacity to monitor changes in carbon stocks			
Value (number)	0	No target value set	10	10
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	The Project formed a consortium of experts with partnering institutions which have capacity to monitor carbon stocks. Target met.			
Indicator 9:	MIS developed and operational			
Value	TOR prepared	No target value set	Complete	Developed, staff trained and software installed
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	MIS developed but not fully operational.			
Indicator 10:	Percent of disbursements executed according to cost and timeframe specified in the disbursement schedule			
Value (percentage)	45	No target value set	80	92
Date achieved	06/06/2008		03/04/2010	10/31/2010
Comments	The total amount disbursed was US$3,784,950.64.			
Indicator 11:	Percent of procurements executed according to cost and time scheduled specified in the procurement plan			
Value (percentage)	30	No target value set	95	95
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	This indicator was newly introduced after the MTR. Target met.			
Indicator 12:	Percent of activities executed according to time schedule specified in the work plan			
Value (percentage)	60	No target value set	90	90
Date achieved	06/06/2008		03/04/2010	06/30/2010
Comments	Target met.			

G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	GEO	IP	Actual Disbursements (US$ millions)
1	06/29/2005	Satisfactory	Satisfactory	0.00
2	12/28/2005	Satisfactory	Satisfactory	0.40
3	06/19/2006	Satisfactory	Satisfactory	0.40
4	12/12/2006	Moderately Satisfactory	Satisfactory	0.70
5	06/19/2007	Moderately Unsatisfactory	Moderately Unsatisfactory	1.09
6	12/17/2007	Satisfactory	Satisfactory	1.66
7	05/28/2008	Moderately Unsatisfactory	Satisfactory	1.84
8	06/27/2008	Satisfactory	Satisfactory	1.84
9	11/23/2008	Moderately Satisfactory	Moderately Satisfactory	2.47
10	05/26/2009	Satisfactory	Satisfactory	2.96
11	12/15/2009	Satisfactory	Satisfactory	3.00
12	05/23/2010	Satisfactory	Satisfactory	3.56
13	06/19/2010	Moderately Satisfactory	Moderately Satisfactory	3.56

H. Restructuring (if any)

Restructuring Date(s)	Board Approved		ISR Ratings at Restructuring		Amount Disbursed at Restructuring in US$ millions	Reason for Restructuring & Key Changes Made
	PDO Change	GEO Change	GEO	IP		
03/04/2010	N	N	S	S	3.41	To introduce the following changes: (a) limiting Project scope, by targeting micro-catchments in five blocks out of the original nine; (b) replacing the original logframe with a results framework; and (c) revising allocation of Grant proceeds.

I. Disbursement Profile

1. Project Context, Global Environment Objectives and Design

1.1 Context at Appraisal

1. ***Country and sector background.*** Western Kenya, which includes Nyanza and Western provinces, is one of the most densely populated parts of Kenya, with up to 1,200 persons per km^2 in rural areas. The region is characterized by low agricultural productivity, high population pressure, and lack of off-farm income opportunities. Over 58% of households live in absolute poverty (below US$1/day). High rural population growth has led to wide-scale abandonment of fallowing and search for new agricultural land. There has been little restriction on encroachment onto steep slopes, wetlands, or forests despite the existence of laws and regulations against such practices.

2. Large gullies that advance at estimated rates up to 200 meters per year result in fourfold sedimentation rates of the basin flowing into Lake Victoria over the last 100 years. The high levels of nutrient and soil loss are primarily linked to deforestation, human or animal induced vegetation loss on slopes and near waterways, and alteration of soil chemical properties owing to agricultural production. Communities have relatively limited awareness about upstream or downstream problems, and mechanisms for addressing land degradation across administrative and geographical boundaries have been slow to develop.

3. ***Project contribution to the Country Assistance Strategy (CAS).*** The primary rationale for Bank assistance to the Project was to contribute to the CAS's focus on community based initiatives in the fight against poverty. In particular, this Project was seen as an important pilot activity for the formation of community driven development projects in Western Kenya. In addition, the Bank possessed a comparative advantage in securing cross-country cooperation and in making available considerable knowledge and experience in Project design and institutional arrangements that had worked in similar African conditions.

4. ***Project consistency with Global Environment Facility (GEF) Strategic Priorities.*** Project activities were consistent with the objectives set out in the GEF Operational Program 12 on Integrated Ecosystem Management (IEM). The Project was specifically designed to provide global benefits with regard to biodiversity, climate change, and international waterways. Furthermore, the Project supported Operational Program 12 outcomes for increased institutional capacity to implement IEM and investments based on stakeholder participation to address both domestic and global environment issues and apply a community driven methodology.

1.2 Original Project Development Objective (PDO), Global Environment Objective (GEO), and Key Indicators

5. ***The Project Development Objective (PDO)*** was to improve the productivity and sustainability of land use systems in selected watersheds in the Nzoia, Yala, and Nyando river basins through adoption of an integrated ecosystem management approach. In order to achieve this, the Project was intended to: (i) support on- and off-farm conservation strategies; and (ii) improve the capacity of local communities and institutions to identify, formulate, and implement IEM activities (including both on- and off-farm land use planning) capturing local and global environmental benefits.

6. ***The Global Environmental Objective (GEO)*** was to promote a set of integrated ecosystem management interventions so as to achieve local and global benefits. These benefits were to include reduced land degradation, reduced greenhouse gas (GHG) accumulation in the atmosphere,

improved on- and off-farm biodiversity, and decreased erosion in watersheds that feed into the Nyando, Yala, and Nzoia river basins.

7. ***Original key performance indicators*** are shown in Annex 2.

1.3 Revised PDO, GEO and Key Indicators, and reasons/justification

8. ***Project Restructuring.*** The Mid-Term Review (MTR) held in June 2008 led to: (a) revision of performance indicators; (b) Project scope adjustment; and (c) reallocation of Grant proceeds in order to address the ambitiousness of the Project design and original targets. Those changes were formalized in March 2010 in the Project restructuring:

a) ***Revised indicators.*** The original logframe was replaced by a results framework, leaving the original PDO and GEO unchanged. The revised indicators are shown in Annex 2. Reasons for the revision was to enable performance monitoring in a more direct and effective manner, given that some of the original indicators (e.g., negative trends in erosion rates and phosphorous runoff, and above- and below-ground carbon sequestration monitored and assessed) were overly ambitious, difficult to measure, or had little or no systematic linkage to the outputs and outcomes in the existing results chain. With this in mind, several of the original indicators were replaced by more realistic and measurable ones, including those for the PDO and GEO, taking the available baseline data into account.

b) ***Limiting the Project scope.*** Spatial coverage of the target basins proved to be too large to be realized within a limited funding envelope. The MTR mission reviewed and reduced Project intervention areas from nine to five blocks: three blocks in Nyando, as well as lower blocks of the Yala and Nzoia rivers. It was also recognized that the Project would not be able to cover the overall area of those blocks. Thus the Project targeted 15 micro-catchments within five blocks as centers for technology transfer and information dissemination without running the risk that Project resources would be spread too thin.

c) ***Reallocation of Grant proceeds.*** Implementation costs for a decentralized and community-based Project were underestimated at appraisal, particularly in view of declining United States dollar values and rising fuel costs. To adequately fund critical activities, the Project revised allocation of Grant proceeds at restructuring. As a result, a substantially larger portion was allocated to the Project administration to cater for underestimated costs of community mobilization and decentralized implementation while the allocation for the procurement of goods was reduced.

1.4 Main Beneficiaries

9. ***Main beneficiaries.*** The Project implemented its activities in the selected catchments of the Nyando, Yala, and Nzoia river basins in Western Kenya, which are home to a population of nearly seven million. The Project was designed to target local communities in those areas as primary beneficiaries.

10. ***Characteristics of the target communities*** include (i) farming is the primary livelihood activity for about 80% of the population in the three river basins; (ii) HIV/AIDS rates are among the highest (35% in Kisumu in 2001) in the country and have left a growing number of rural households headed by widows or orphans; and (iii) female headed households account for 35% of the total in some Project areas.

11. ***Secondary beneficiaries.*** The Project intended to promote global benefits with regard to

conservation and sustainable use of biological diversity, *reductions in net emissions and increased storage of greenhouse gases* and *conservation and sustainable use of water bodies* in line with GEF objectives, thus benefiting anyone affected by the conservation of natural habitats and mitigation of global warming. The Project was also expected to generate insights into successful, community-based IEM models that could be replicated in similar projects, and hence benefit other target communities.

1.5 Original Components

12. ***IEM approach*.** Where promoting productive activities may conflict with ensuring ecosystem services, IEM is a means of balancing increased production with environmental protection. A key element of IEM in the Project was to link upstream and downstream communities to better manage river catchments as a whole through planning and financing of interventions that incorporated cross-community concerns.

13. ***Component 1: Capacity Building for Community Driven Integrated Ecosystem Management.*** Activities focused on two areas of capacity building: (i) strengthening the development and IEM planning capacity of rural communities and local governments through organizational and managerial support and transfer of technical knowledge; and (ii) piloting carbon finance mechanisms. The component had two subcomponents: (i) strengthening local development and IEM planning; and (ii) enhancing capacity for developing carbon finance proposals.

14. ***Component 2: Scaling up and Financing IEM Interventions.*** The Project provided funds for the implementation of IEM activities identified under the first component. Activities were to include (i) development of village nurseries to support agro-forestry; (ii) dissemination of improved fallow and cover crop technologies to control land degradation and reduce sediment loss; (iii) training on improved land management practices; and (iv) a selected number of small-scale infrastructure activities. Where appropriate and incorporated in Participatory Action Plans (PAPs) at micro-catchment level, the Project extended grants for community-based sub-projects to implement those activities.

15. ***Component 3: Establishing a Monitoring and Evaluation (M&E) System.*** Activities included establishment of the M&E system for the Project to assess Project outcomes and impacts directly and to refine working methodologies and procedures. The M&E system would also focus on Project socioeconomic and biophysical impacts.

16. ***Component 4 Project Administration.*** This component funded activities related to the coordination, administration, monitoring, and auditing of Project activities, including operation of a Project coordination office in Kisumu. It also acted as a vehicle for collaboration and coordination with other relevant programs.

1.6 Revised Components

17. No change was made in planned activities within each component.

1.7 Other significant changes

18. ***Reduced availability of funds.*** The fact that anticipated co-financing of about US$2.7 million (Policy and Human Resources Development (PHRD) Fund as well as the Swedish International Development Cooperation Agency (SIDA)) did not materialize required changes to the Project design, as described in section 1.3. These changes were made to better align the

Project to the present situation and allow it to deliver tools to promote IEM in Western Kenya, which could be subsequently scaled up through existing and planned Bank operations.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

19. ***Scientific design vs. development challenges.*** The World Agroforestry Center (ICRAF) played a central role in Project design by completing baseline surveys, designing Project interventions, mapping geographic areas, and supporting the establishment of the M&E system. The Project's design had a strong scientific perspective to address degradation of natural resources (land and water), and paid little attention to on-the-ground expectations by farmers. For instance, a block-wise approach met scientific requirements to standardize data but was not aligned with either community structure or ecological boundaries. A theoretical Project design and highly technical skills required for data analysis posed a challenge to the implementing agency, contributing to initial implementation delays. As a result, except for an initial advance of US$400,000, no disbursement was made during the first year of implementation.

20. ***Geographic focus and coverage of the Project.*** The Project considered several alternatives in determining geographic coverage (e.g., all lands within the Lake Victoria watershed, or fewer river basins), and selected the priority districts taking into account GEF criteria: carbon sequestration and biodiversity increment potential, severity of land degradation, and the proximity to reserves with significant degradation because of external pressure. However, covering nine blocks (10km*10km each) in three river basins (upper, middle, and lower blocks in each respective basin) proved to be too large to implement effectively. Prior to the MTR, the Project concentrated its interventions exclusively in the lower blocks, resulting in the reduction of the target areas (see paragraph 8(b)) during the later stages of the Project.

21. ***Weak attention to immediate livelihood needs.*** Project design did not initially include livestock aspects and social dimensions to help address people's stagnant incomes, which were of central interest to the local communities. As a result, Project staff faced difficulties in mobilizing communities and sustaining Project interventions without incorporating immediate livelihood enhancement options into longer-term conservation activities. In recognition of this, technical expertise (e.g., a livestock officer) was retained and livelihood support activities were diversified to address these needs during the early stages of implementation.

22. ***Lessons of earlier operations reflected.*** The Project built upon and complemented other projects in the area (specifically the Soil Management Project (SMP), Agricultural Technology and Information Response Initiative (ATIRI), Legume Research Network Project (LRNP), and Lake Victoria Environment Management Project (LVEMP)). Some of the lessons drawn from the implementation experience of these projects were reflected in the Project's institutional arrangements including: (i) decentralization of Project management and involvement of local stakeholders in the decision making process; and (ii) implementation arrangements to manage household-led activities under community-led umbrella projects.

2.2 Implementation

23. ***Slow start-up.*** The Kenya Agricultural Research Institute (KARI) was selected as an eligible implementing agency for a full-sized GEF Project to take the lead in carrying out Project activities. However, few of KARI staff who was in charge of implementation was involved in

designing the Project. As a result, KARI staff in Kisumu required considerable time and efforts at the initial stages of implementation to acquaint themselves with Project concepts. Part of initial implementation delays was attributed to this, coupled with financial flow constraints and, to some extent, the 2007 post-election crisis.

24. ***Working relationship between KARI and ICRAF.*** Approaches in KARI and ICRAF were different with respect to various aspects of Project implementation (e.g., a contact-farmer vs. bottom-up participatory approaches) that complicated working relations between the two at first. Frequent staff changes within ICRAF added another difficulty in building an effective partnership and fulfilling commitments between the two agencies.

25. ***Linking upstream and downstream interventions.*** The Project gave insufficient focus on linking upstream and downstream interventions in addressing broader ecosystem management aspects. While such linkages were conceptualized in the Project design in order to optimize the effectiveness of ecosystem interventions, measures to achieve such outcomes were not clearly articulated in Project documents. In the early stages of implementation, KARI fastened much of its attention on the lower Nyando, since it was the most severely degraded area characterized by large gullies threatening livelihoods of local communities. The failure of adjusting this focus in a timely manner resulted in the devotion of significant human and financial resources to the lower blocks for more than two years. Subsequently, limited time and efforts were given to involve upstream communities in undertaking joint conservation measures in order to achieve the Project objectives of improving sustainability of land use systems and reducing soil erosion in the respective watersheds.

2.3 M&E Design, Implementation and Utilization

26. ***Delayed establishment of a results-based M&E system.*** Before the MTR, KARI had reported their implementation progress without ensuring linkages of activity outputs to performance indicators in the logframe. A viable M&E system was established only after the MTR (the third year) despite the fact that every mission had identified its necessity from the start of the Project, and the Bank had provided technical assistance for the development of a results-based M&E system. As a result, baseline values were established at the MTR that allowed the M&E of outcome indicators only for the last two years of Project implementation.

27. ***Development of Management Information System (MIS).*** The MIS was developed and successfully installed at the end of the fourth year. Its use within the Project, however, has been limited due to the winding up of activities toward Project completion and cash flow problems. In addition, staff felt that they needed more time to practice with the system before acquiring sufficient confidence to use it. In order to better utilize Project outputs and strengthen the institution's M&E capacity, KARI management plans to integrate the MIS into an agency-wide M&E program.

2.4 Safeguard and Fiduciary Compliance

Environment and Social Safeguards Compliance

28. The Project complied with World Bank safeguard policies as identified in the PAD, specifically (i) OP 4.01 Environmental Assessment; and (ii) OP 7.50 Projects in International Waters. Even though the project did not finance or support any activities that affected natural habitats, or the procurement or use of pesticides directly or indirectly, the Bank advised KARI as

part of its implementation support to take proactive measures for sustainable wetlands management and integrated pest management through additional survey and targeted training.

29. ***Screening and development of EMPs under ESMF*.** Under the Environmental and Social Management Framework (ESMF) elaborated for the Project, sub-project proposals were adequately screened before approval using a safeguards checklist. The Project developed Environmental Management Plans (EMPs) for construction of three water pans and undertook mitigation measures against potential negative impacts.

30. ***The Project Environmental Officer*** was recruited in the third year of implementation to provide supervision support to the implementation of environmental safeguards aspects (no social safeguards policies were triggered). Nevertheless, supervision was less than optimal because of flow of funding problems. The Project could never undertake environmental audits and related training for environmental monitoring of a rehabilitated water pan by the end of the Project, making sustainability of its environmentally sound management by communities uncertain. A targeted training module on sustainable wetlands management for relevant stakeholders was not fully implemented either.

Fiduciary Compliance

31. ***Project financial management (FM) performance*** was one of the greatest challenges, which was rated unsatisfactory for most of the implementation period. FM supervision missions repeatedly recommended corrective measures in the areas of: (i) unresolved GEF fund flow constraints resulting in a shortage of resources in the Project account; (ii) irregular provision of counterpart contributions by the Government of Kenya (GoK); (iii) non-submission of quarterly financial monitoring reports (FMR) in defiance of financial covenants; (iv) commingling of Project funds with KARI's Development Vote funds; (v) exhaustion of funds allocated to the training category without timely intervention by Project management; (vi) poor maintenance of Project cash book at KARI Headquarters and the Project Coordination Office (PCO) in Kisumu; and (vii) inadequate document filing practices at PCO. Project management addressed most of these problems in due course, but some areas, such as flow of funds constraints and FMR submission, remained weak over the life of the Project.

32. ***Flow of funds problems*** were caused by the lengthy administrative process (from PCO to KARI Headquarters to Ministry of Agriculture and to Treasury) leading to severe delays in submitting withdrawal applications. Irregular submission of SOE-based applications by KARI exacerbated the situation, resulting in exhausting the Project account and dealing on credit. As a result, 98 sub-projects developed by community groups in the Lower Yala and Nzoia river basins received grants of a total of KES9.8 million (approx. US$121,000) shortly before the Project closure, after awaiting financing for nine months since approved. 65 sub-projects in the upper and middle Nyando were never approved due to the lack of funds. Some of Project activities missed the optimal timing (e.g., tree planting along with initiation of rainy seasons) or were not realized to the extent as planned (e.g., safeguards training and exchange visits of community groups). Slow disbursements also adversely affected the momentum of the community engagement as shown in Annex 6. US$315,000 (7.7%) was left undisbursed at Project closure.

33. ***Procurement performance.*** Considering the funds flow constraints experienced over much of the Project's life, procurement has been affected negatively. This led to delays in procurement processes and subsequent slow implementation start. While this situation had improved towards the MTR (at which time much of the major procurements had been finalized), contract

management (such as the speedy follow up on delayed deliverables, closure of non-performing contracts) has been one of the main challenges towards the end of the Project. PCO had to work hard over the last six months to ensure an orderly closure of existing contracts and to avert contractual disputes while ensuring their value for money.

2.5 Post-completion Operation/Next Phase

34. An impact assessment study at Project completion reported that land management practices adopted most by communities were crop rotation and minimum tillage other than tree planting. Since improving the sustainability of land use systems was one of the two components of the PDO, establishing an effective strategy and mechanism to sustain the IEM activities adopted is a key to achieve the objectives. In recognition of this, the Project conducted the following operations.

35. ***Community sensitization and exit strategy discussion.*** Sensitization meetings were held in all Project intervention areas to discuss the exit strategy for sustaining community activities beyond the life of the Project. Some communities have successfully evolved to be self-sustaining commercial enterprises to tap the local market for their new commodities such as tree seedlings, and have received grants from other funds such as the Constituency Development Fund (CDF) to implement their PAPs.

36. ***Post-completion operation.*** The Project established formal institutional linkages (e.g., Technical Advisory Group (TAG) at the Project level and Basin Technical Committees (BTCs) at the district level) and informal networks among extension service providers that will provide longer-term support to the community-based activities and promote their sustainability after Project closing. The Project also facilitated to formalize some micro-catchment committees under either the Water Resource Management Authorities (WRMA) or the Ministry of Gender, Children and Social Development[1].

37. ***Knowledge and experiences sharing.*** The pool of experienced staff on sustainable land management and community-driven watershed rehabilitation is now available in KARI and can assist in effective implementation of other similar projects. Dialogue with other Bank projects has been established for this purpose. KARI also plans to publish a manual of best practices and lessons learned that documents the process of engagement with communities and provides illustrative cases of best practices on IEM and livelihoods activities. This will provide a valuable learning and reference tool for other Bank projects that implement community-driven environmental and livelihood initiatives.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

38. ***Relevance to country priorities.*** Improving the productivity and sustainability of rural land use systems remains a GoK priority. In mid-2008, the government developed a long-term development strategy, Vision 2030, which aims to transform Kenya into a globally competitive, prosperous, middle-income country by 2030. One of the three pillars of this strategy is a social one that aims to build a just and cohesive society enjoying equitable social development in a secure environment. A Medium-Term Plan (MTP) for the first five-year phase from 2008 to 2012

[1] All the five micro-catchment committees in the lower Yala block have been registered as part of the Water Resource Users Associations under the WRMA regional Siaya office.

identifies agriculture as a key sector and focuses on policies and programs for enhancing food security, productivity and value added.

39. ***Bank assistance strategy.*** Corresponding to the government priorities, the Country Partnership Strategy (CPS) for Kenya issued in 2010 highlights the improvement of natural resources with a special focus on climate change and disaster responsiveness. One of the elements under this objective is to manage land and water resources, especially in key water catchment areas by supporting investments that reduce vulnerability of farmers to weather shocks through income diversification, livestock management, and improved soil and water conservation. Emphasis is also given to the enhancement of agricultural productivity and food security in order to help unleash Kenya's growth potential.

3.2 Achievement of Global Environmental Objectives

40. ***General Assessment.*** Outcome indicators achieved their targets mostly satisfactorily, with some of the targets exceeded. However, prolonged financial flow constraints undermined the sustainability of some achievements and, considering the Project's small coverage within the total watershed area in Western Kenya, its contribution toward the achievement of global benefits was limited. Achievements based on the results framework elaborated at the MTR are shown in Annex 3.

Achievement of Project Development Objective

41. The targets of the PDO outcome indicators were achieved in full in terms of engagement with the direct beneficiaries. About 7,500 households (close to 40,000 people) have collaborated with the Project over the last five years, with 90% of sampled households giving a satisfactory rating or more in the stakeholder satisfaction studies. The number of food-deficit months per annum has decreased by one month (from 5.3 to 4.3 months) for beneficiary households between 2004 and 2009 while surrounding non-participants of the Project reported an increase from 4.9 to 5.4 months over the same period.

42. While a productivity of maize as staple food was not significantly changed as shown in Annex 4, ten to twenty-fold increases in maize yield on small acreages were cited by some beneficiary households. Higher yields of cash crops (e.g., tissue bananas and vegetables) as well as diversification of farm products (e.g., livestock, honey and tree seedlings) are assumed to have provided higher monetary income to beneficiary households. This in turn enabled those households to purchase more food, resulting in decrease in food-deficit months. In order to achieve this, the Project supported to (i) develop and implement PAPs (82% implemented) as on- and off-farm conservation strategies (off-farm included water pan construction, river bank protection, and gully rehabilitation) prioritized by communities; and (ii) build communities' capacity (90% of target households participated) and set up institutional linkages and informal networks (95% of identified institutions participated) for coordinating community-driven IEM activities.

43. On the other hand, however, the sustainability of land use systems was not fully attained mainly due to (i) financial flow constraints discussed in section 2.4; and (ii) insufficient understanding of Project staff with regard to upstream-downstream linkages to enable longer-tem environmental improvements. Grants for sub-projects provided shortly before the Project closure raise the risk of unsustainable resources management without having proper monitoring and technical assistance by the Project. Community groups in the upper and middle Nyando never had opportunities to finance and scale up their IEM activities (Component 2) due to limited time and

resources availed by the Project, making likelihoods to be able to sustain their practices questionable. The beneficiary survey showed that about half of the respondents had partly implemented new skills gained through the Project, while the other half had not; about 30% of them attributed this poor response to lack of funds.

Achievement of Global Environmental Objective

44. GEO was intended to achieve local and global benefits including: reducing land degradation; reducing GHG accumulation in the atmosphere; improving on- and off-farm biodiversity; and decreasing erosion in watersheds that feed into three river basins. The Project reduced GHG accumulation by reforesting 1,820 hectares of area for carbon sequestration (as compared with a target value of 1,200 hectares) and the observed incidence of soil erosion decreased from 60 to 45% of erosion-prone clusters identified in the Project intervention areas. While quantitative changes in biodiversity and land degradation are unknown due to methodological difficulties and subsequent changes of outcome indicators, qualitative increases in crop and tree species were observed in the on- and off-farm intervention areas.

45. Project interventions in the 15 micro-catchments in three river basins, which represent less than 2% of the total watersheds area in Western Kenya, are unlikely to generate significant regional or global benefits beyond target river basins. The Project did not articulate adequate linkages of Project interventions to global environmental benefits in its design and set highly ambitious objectives despite the comparatively limited scope and financial resources available to the Project.

3.3 Efficiency

46. An ex-post economic analysis was conducted to assess the Project's financial and economic viability. Given the difficulty in quantifying benefits of certain ecosystem interventions, as well as of observing visible change in outputs shortly after Project interventions, the analysis was confined to a sub-set of IEM activities adopted by communities such as tree planting, beekeeping, and water pan construction.

47. A greater increase in adoption rates of tree planting activities was observed in beneficiary households compared to control groups (timber trees and fruit trees: 23% increase in adoption over the Project period; fodder trees: 39%; and soil fertility trees: 40%). At the Project level, the economic rate of return (ERR) over 22 years was estimated to be 18%, while the estimated ERR at Project appraisal was 14% in an alternative scenario of decreased number of beneficiaries. The detailed results of economic analysis are shown in Annex 4.

3.4 Justification of Overall Outcome Rating

Rating: **Moderately Satisfactory**

48. There existed a disconnect between overly ambitious Project objectives/targets (as discussed in paras. 8 and 58) and the Project design to achieve them given the limited scope of activities it actually finances. While the PDO and GEO were unchanged throughout the Project, the restructuring addressed the ambitiousness of the original targets so that revised ones could more accurately capture the achievement of the Project objectives. The Project largely achieved its revised targets with required efficiency while the sustainability of adopted land use systems was less attainable and the Project's contribution toward the achievement of global benefits was limited. Taking into account all those factors, the overall project performance is rated as *Moderately Satisfactory*.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

49. ***Poverty impacts.*** The beneficiaries ranked improved food yield and food security as the second largest impact (23% of all the impacts identified), next to the improved environment (31%), of IEM technology adoption. Increased food production has a direct impact on poverty alleviation as the study recently conducted in the lower Nzoia river basin indicated that food was the biggest priority (accounting for 30% of all the needs) identified by local respondents.

50. ***Gender aspects.*** When working with communities, Project staff paid attention to ensure equal representation of men and women. The communities were also sensitized through discussions of gender roles and responsibilities (i.e., those of men, women and youth), leading to greater appreciation of roles undertaken by women and the necessity of including them in decision making.

51. ***Empowerment of the vulnerable.*** In Project areas, women were traditionally not allowed to plant trees on farms where adult men were exclusively entitled to land ownership. Young men do not have access to land until it is inherited by their fathers as head of households. Vulnerable groups such as the disabled, HIV/AIDS positive people, and widows also had difficulties making a living. Involving and empowering the vulnerable was a key in the Project's poverty alleviation and social inclusion approach as they are normally the poorest and most marginalized in the society.

52. By the end of the Project, a number of positive results have been observed. The good performance of a youth group convinced their parents to divide land to them in order to allow them to continue their IEM activities (such as establishment of tree nurseries). A group of women evolved to become resource persons to train other communities on IEM practices. A widows group established a dairy goat multiplication center and supported people living with HIV/AIDS in producing high nutrient crops such as grain amaranth.

(b) Institutional Change/Strengthening

53. ***Inter-institutional partnership*** was one of the important added values of the Project. The Project presented a multi-actor scenario, which directly or indirectly involved several different actors at both the district and division levels. For instance, the Ministry of Agriculture extension staff at the division level has worked with local communities to implement agriculture-related sub-projects as part of their departmental responsibilities while staff at the district level provided technical backstopping for the Project as member of the BTCs.

54. The BTCs encompassed all relevant sectoral government ministries and Non-Governmental Organizations (NGOs) (e.g., agriculture, livestock, water, environment, forestry, public health, social services, etc.) and provided a forum to discuss common challenges at the micro-catchment level, normally across administrative boundaries. Through these efforts, some of the micro-catchment committees were integrated into Water Resource Users Associations under WRMA and backstopping roles in tree nurseries management were increasingly taken over by the Kenya Forest Service (KFS) and an NGO.

(c) Other Unintended Outcomes and Impacts

55. ***Attitude change.*** The Project needed to deal with traditional beliefs of local communities (e.g., preference for exotic tree species over indigenous ones, avoidance of specific plant species, and prohibition of tree planting by women, etc.) that at first prevented the equal representation in the community groups as well as the adoption of appropriate land management technologies.

Resistance to change prevailed at the beginning but, through patient communication by KARI field staff and demonstration on pilot plots, these perceptions have been gradually altered. Beneficiary households demonstrated higher adoption rates of IEM practices and larger knowledge gain compared to those of control groups as shown in Annex 4. Through interactive dialogue with community members, Project staff also learned useful land management practices based on indigenous knowledge (e.g., use of ash for termite control).

56. ***Publicity effect.*** Publicity of Project initiatives, through awards at contests such as at the Agricultural Society of Kenya and through newspapers and radio documentaries, led some of the buyers for tree seedlings and agricultural products to approach community groups on their own initiative, which helped in sustaining some productive activities even before the Project closure. On the other hand, the Project experienced some elite capture where individuals were able to acquire external funding support for their own purposes under the pretext of community development.

4. Assessment of Risk to Development Outcome

Rating: **Substantial**

57. The risk to both the PDO and GEO is assessed as *Substantial*, considering several factors that may affect the maintenance of development outcomes:

a) ***Financial*****:** Management of tree nurseries relies on the arrangements for input provision and payment for seedlings made by the Project. Continuation of the activities beyond the Project life remains uncertain depending on access to markets and identification of new buyers of tree seedlings. However, some of the community groups were sufficiently proactive with the support of Project staff to identify and trade with local buyers such as NGOs, KFS and private entities. In addition, new agricultural legislation[2] will require that all farmers maintain a minimum of 10% of their agricultural lands in tree cover. This policy will, thus, help markets for tree seedlings to expand.

b) ***Environmental*****:** Weak involvement of upstream communities will make environmental benefits such as decreased land degradation and soil erosion less attainable over the longer term. Nevertheless, local benefits of carbon sequestration and biodiversity conservation are expected to increase over time due to the plantation of indigenous trees with high survival rate promoted under the Project.

c) ***Institutional support*****:** The sustainability of outcomes realized through the implementation of small grants sub-projects depends in part on technical backstopping and supervisory services by KARI and other local institutions. The positive aspect is that the contacts were established through the Project between communities and extension service providers at the division level to support day-to-day activities based on each organization's respective mandates. On the negative side, however, limited resources, understaffing, and high turnover of extension officers in local institutions will make continuation of their support dependent on available financial and human resources. At least for the Nyando river basin, collaborative arrangements are being explored to continue some of these tested activities and partnerships through financing under LVEMP II. In addition, considering the strong advocacy for

[2] The Agriculture (Farm Forestry) Rules 2009 under the Agricultural Act (cap. 318)

decentralization under the new Kenyan Constitution, there are opportunities to mainstream and upscale watershed-based approaches in new local government structures. These will improve prospects for results uptake.

5. Assessment of Bank and Borrower Performance

5.1 Bank

(a) Bank Performance in Ensuring Quality at Entry

Rating: **Moderately Unsatisfactory**

58. Quality at Entry was rated Moderately Unsatisfactory by the Quality Assurance Group (QAG) because (i) the Project's development objectives were quite ambitious for an operation of comparatively limited scope in terms of the activities it actually finances; (ii) the broader ecosystem management aspects were given insufficient attention since most of the Project's focus was on-farm interventions; and (iii) the Project did not demonstrate adequate linkages to global environmental benefits it aims to achieve.

59. In retrospect, considering the challenges experienced at start up and early implementation, QAG's assessment has been confirmed, in particular as few efforts were made for adjusting the original design based on the QAG review. The adoption of a micro-catchment approach only later introduced adequate linkages of on-farm investments to broader ecological services and benefits, which helped foster a more integrated landscape approach.

(b) Quality of Supervision

Rating: **Moderately Satisfactory**

60. Bank supervision was not always optimal in terms of providing timely and pro-active support to overcome experienced implementation challenges, particularly financial management, technical capacity as well as a complex working relationship between KARI and ICRAF (as a major partner in implementation). Nevertheless, once the Project addressed the design flaws by adjusting the Project scope and adopting a reasonable results framework, performance improved with specialized support provided by the Bank for several key aspects:

a) ***Financial supervision*:** Bank supervision missions provided specific recommendations to assist KARI to address FM challenges including the flow of funds, financial reporting, bookkeeping, and document filing. The Bank conducted a FM clinic in 2009 with all parties concerned including Treasury, the Ministry of Agriculture and KARI to identify bottlenecks in processing withdrawal applications seeking for speedy resolution through consultation.

b) ***Monitoring and evaluation*:** Various levels of support were given during supervision in assisting the Project to shift from a logframe to a results framework; the Bank team worked with Project staff to clarify linkages between a results framework, work plans and a M&E system and to integrate a results chain approach into Project management and a MIS. The integrated M&E system has since been established by KARI.

c) ***Environmental safeguards*:** As part of the overall review of Project's due diligence with respect to Bank safeguard policies, the Bank proactively advised KARI to conduct situation analysis and targeted training for sustainable wetlands management and integrated pest management so that the Project could maximize its potential benefits in those areas.

(b) Justification of Rating for Overall Bank Performance

Rating: **Moderately Satisfactory**

61. Original shortcomings in Project design were overcome by reaching strategic agreements with KARI to restructure the Project, and adopting an adaptive management approach. This allowed for flexibility in addressing emerging issues, assisted the Project to achieve its development objectives and disburse the grant in almost full. However, there might have been even more opportunities for an integrated watershed-based approach to realize greater environmental benefits, if adjustments to the Project design and scope had been carried out earlier by the Bank. In the latter case, the Bank performance would have been rated as *Satisfactory*.

5.2 Borrower

(a) Government Performance

Rating: **Moderately Unsatisfactory**

62. ***GoK commitment.*** Government performance during Project implementation was mixed. On the positive side, a government ownership was ensured throughout the Project period, partly contributing to the achievement of Project objectives. In addition, noting that the Agricultural Sector Development Strategy demands an increase of the State forest cover up to 10% and new agricultural legislation requires expansion of tree cover on more than 10% of farm lands, evolving market opportunities will promote the sustainability of tree nursery management initiated by the Project.

63. ***Counterpart funding and funds flow.*** On the other hand, the quarterly provision of counterpart funding by the GoK (Ministry of Agriculture) was erratic, forcing KARI to advance its own resources to cover counterpart expenditures. The lengthy bureaucratic process of withdrawal applications through the line ministry and Treasury delayed timely disbursements. This in turn obstructed critical Project activities because funds to pay for the procurement of goods and services, sub-projects as well as incremental operational costs were not available on time. It also negatively affected communities' motivation and cohesion due to long outstanding commitments by the Project. In some cases, KARI could not comply with its financing commitments for two years, which both demoralized communities and slowed down Project progress. Although the issue was raised repeatedly by the Project team and the Bank, adequate interventions were not made in a timely and responsive manner to resolve the problems.

(b) Implementing Agency or Agencies Performance

Rating: **Moderately Satisfactory**

64. ***Strong performance of field staff.*** Despite various challenges it faced including the partnering relationship with ICRAF and financial flow constraints, the KARI Project team in Kisumu showed satisfactory performance in meeting Project requirements as a result of its strong commitments and the dedicated efforts of its field staff in particular. Although shortage of Project staff and delays in recruitment for vacant positions were observed at the early stages of Project implementation, and training plans for Project staff were negatively affected by financial flow constraints, the Project team has successfully accumulated expertise in community mobilization and IEM promotion, which can be capitalized upon in follow-up operations as well as in other relevant projects.

65. ***Institutional arrangements.*** The supervision functions of Project operations were adequately decentralized to Kisumu where the PCO was located. However, providing day-to-day support to communities by Kisumu-based staff still represented challenges in terms of efficiency, accessibility and visibility. After the MTR, the recommended relocation of field staff to their respective river basins for closer support was partially implemented in upper and middle Nyando basin.

66. ***Fiduciary management.*** KARI Headquarters played central control functions in major financial decisions and procurement performance was rated satisfactory over the Project period. Nevertheless, several financial actions such as quarterly remittances to the Project account and submission of withdrawal applications and FMRs were not undertaken in a timely manner impeding the vital liquidity for Project activities.

(c) Justification of Rating for Overall Borrower Performance

Rating: **Moderately Satisfactory**

67. KARI's strong ownership and dedication enabled the Project to achieve the intended objectives to a satisfactory level. Those achievements as well as enhanced partnership with local institutions and participatory management of community-driven initiatives were attributed to the strong performance of KARI field staff. On the other hand, there were weaknesses in the agency's fiduciary management, some of which were not adequately addressed until the end of the Project.

6. Lessons Learned

68. ***Key lessons for community mobilization and sustainability of IEM activities.*** The Project designed and tested models for community-based IEM. Some learning experiences that proved their effectiveness are as follows:

a) ***Addressing immediate livelihood needs***. Living in absolute poverty, people give priority to food security and income generation. Since environmental interventions such as tree planting and soil and water conservation normally take a long time for desired benefits to be generated, integrating pro-poor, livelihood enhancement options that produce immediate economic gains into community-driven activities was essential to sustain communities' motivation and cohesion. This also helped participating communities understand linkages with broader environmental benefits.

b) ***Importance of participatory planning and interaction process.*** Conventional one-way transfer of technology and knowledge never took root in the communities; by undertaking the joint process of priority identification and action plan development, community ownership could be ensured, which in turn strengthened the sustainability of Project activities. Interactive knowledge sharing could also enrich the selection of technologies which are tailored to the local context using locally available knowledge and resources.

c) ***Potential multiplier effects by longer interventions.*** At the initial stage, the Project had to deal with resistance to Project interventions due to cultural beliefs and practices the communities had. The Project revealed that changing local mindsets required patient and tireless efforts as communities had a steep learning curve. However, once the positive results of the new technologies became apparent, communities became quite cooperative and eager to expand their activities, revealing the potential to amplify the Project outcomes.

69. ***Preventive and holistic approach to ecosystem management should be integrated with curative/reactive measures***. The Project did not effectively curb already extensively degraded areas such as gullies in the lower Nyando since it could not sufficiently extend its resources to upstream interventions. A holistic approach at the entire catchment level should be used to address critical degradation causes to better regulate water flows in the catchment and subsequently achieve economic and environmental sustainability.

70. ***The Project proved the effectiveness of integrating existing relevant institutions into its implementation framework.*** Since KARI is a research institution in agriculture, cross-support by

line ministries having mandates of policy implementation was essential to bring the necessary expertise and ensure consistent support to community activities initiated under the Project. The cross-sectoral coordination bodies established by the Project facilitated mutual understanding and collaboration among local institutions that will not only contribute to the sustainability of Project activities, but also provide complementary and better aligned service delivery based on their own institutional mandates.

71. ***Project design and expected outcomes need to be aligned with existing capacity and available financing.*** The Project performance was significantly affected by unavailability of anticipated co-financing as well as low institutional capacity for Project implementation, which required close supervision and an adaptive management approach at all stages of Project implementation. In addition, modifying Project design (e.g., reducing scope and areas of intervention) should be considered early on to ensure that the adjusted Project can achieve tangible results.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) **Borrower/implementing agencies**

72. KARI largely agreed with the overall assessment and ratings of the Bank's ICR. The Borrower's ICR (summarized in Annex 7) provided an assessment similar to the findings of the Bank's.

73. Nevertheless, KARI felt that an upgrading of the overall outcome rating could be considered, based on satisfactory achievements of outcome indicators toward their targets. While the Bank agrees that the Project largely achieved its revised targets, the outcome rating assessment is given based on the combination of relevance of objectives/design, achievement of development objectives and efficiency. Thus the rating encompasses the extent to which PDO is achieved. Taking into account that the sustainability of adopted land use systems, one of the two components of PDO, was less attainable due to financial and human resources constraints, the overall outcome rating was retained as *Moderately Satisfactory*. Other comments made by KARI were reflected into the final report.

(b) **Cofinanciers**

74. Not applicable.

(c) **Other partners and stakeholders**

75. No issues were raised by ICRAF who agreed with (i) ICRAF's role in the implementation and (ii) project outcomes reflected in the ICR.

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in US$ Million equivalent)

Components	Appraisal Estimate (US$ millions)	Actual/Latest Estimate (US$ millions)	Percentage of Appraisal
1. Capacity Building for Community Driven Integrated Ecosystem Management	0.71	0.57	80
2. Scaling up and Financing IEM Interventions	1.54	0.89	58
3. Establishing a Monitoring and Evaluation System	0.90	0.59	66
4. Project Administration	0.95	1.73	182
Total Baseline Cost	**4.10**	**3.78**	**92**
Physical Contingencies			
Price Contingencies			
Total Project Costs			
Project Preparation Facility (PPF)			
Front-end fee IBRD			
Total Financing Required			

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (US$ millions)	Actual/Latest Estimate (US$ millions)	Percentage of Appraisal
Borrower		1.50	1.02	68
Global Environment Facility (GEF)		4.10	3.78	92
International Development Association (IDA)		0.00	0.00	0
JAPAN: Ministry of Finance - PHRD Grants		0.40	0.00	0
SWEDEN: Swedish Intl. Dev. Cooperation Agency (SIDA)		2.30	0.00	0

Annex 2. Original and Revised Performance Indicators

Project Development Objective	Original Indicators	Changes Introduced at MTR	Revised Indicators
Improve the productivity and sustainability of land use system in selected watersheds in the Nzoia, Yala and Nyando river basins through adoption of an integrated ecosystem management approach.	● 80% of targeted communities adopting and implementing integrated ecosystem management (IEM) interventions in project intervention areas and surrounding villages	Revised	● Number of direct project beneficiaries (% of which are women) ● Percentage of households in project intervention areas that are satisfied with project interventions
	● 20% of households in pilot villages, 10% in surrounding villages within 3 tears of technology dissemination	Dropped	
		New	● Decreased number of food-deficit months per annum
Global Environmental Objective	**Original Indicators**	**Changes Introduced at MTR**	**Revised Indicators**
Promote a set of integrated ecosystem management interventions so as to achieve local and global benefits.	● Negative trend in erosion rates from farming plots receiving interventions by end of projects	Revised	● Decreased incidence of soil erosion in project intervention areas
	● Negative trends in phosphorous runoff from demonstration plots in at least50% of focal areas by end of project	Dropped	
	● Increasing trend in abundance and diversity of plant species in at least 30% of focal area intervention sites by end of project	Dropped	
	● Sequestration of 3.3 tons of carbon per hectare in focal areas	Revised	● Area reforested for carbon sequestration
Intermediate Outcomes Per Component	**Original Indicators**	**Changes Introduced at MTR**	**Revised Indicators**
Component 1: Capacity Building for Community Driven Integrated Ecosystem Management			
Strengthened capacity in local development and IEM planning.	● Number of community based organizations or groups established based on a community driven development model	Dropped	
	● 90% of ecosystem management planning activities inclusive of local and/or regional institutions	Continue with target value strengthened	● Participation of local and regional institutions in planning and coordinating ecosystem management activities (% of identified relevant stakeholders)
	● 50% of community participation in village land and management planning exercises by end of	Continue with target value	● Community participation in assessment planning, decision making, implementation , and

	project	strengthened	evaluation of IEM activities (measured in % of households)
	● Number of community participatory action plans (PAPs) created	Continue with target value adde	● Number of community participatory action plans (PAPs) developed
	● Number of farmers, extension experts and service providers trained	Dropped	
	● Number of persons and institutions at local and national level trained or participating in IEM planning	Dropped	
	● 50% of community plans including conservation strategy for endangered or endemic species	Dropped	
	● Inclusion of global environmental benefits (upstream-downstream) in community plans	Dropped	
Enhanced capacity for developing carbon finance proposals.		New	● Number of project ideas[3] on carbon finance developed in project intervention areas
Component 2: Scaling up and Financing IEM interventions			
Appropriate SLM/IEM technologies adopted.	● Number of PAP sub-projects implemented ● Number of intra-community and community conservation activities funded	Revised	● Percentage of PAPs implemented according to planned schedule
	● Increase of below ground carbon in plots where the improved SLM technologies have been adopted by end of project	Revised	● Hectares of land brought under SLM interventions
Component 3: Monitoring & Evaluation and Project Management			
Systems and capacity to measure and monitor carbon stocks built.	● Above and below ground carbon sequestration in project areas monitored and assessed ● Feasible and accurate procedures for accounting and evaluating carbon absorption resulting from project activities ● Net-net accounting and carbon tradeoffs identified	Revised	● Methodology for carbon and other GHG emission measurement developed and baseline available ● Number of experts in participating institutions with capacity to monitor changes in carbon stocks
Management Information System established.	● Social and economic impact of project activities monitored and assessed ● Environmental impact of project	Revised	● MIS developed and operational

[3] The development of project ideas would require the formation of partnerships, consortia, etc. between different partners (e.g. GOK institutions, NGOs, CBOs, CSOs, etc.))

	activities monitored and assessed ● Biodiversity baseline survey completed		
Project implemented according to PIP.	● Disbursements	Continue with target value added	● Percent of disbursements executed according to cost and time scheduled specified in the disbursement schedule
		New	● Percent of procurements executed according to cost and time scheduled specified in the procurement plan
	● Adhere to project work plans	Continue with target value added	● Percent of activities executed according to time scheduled in the work plan

Annex 3. Achievement Based on the Result Framework

Indicators	Baseline Value	Target Value	Actual Values Achieved	Remarks
	June 2008	June 2010		
PDO: Improve the productivity and sustainability of land use system in selected watersheds in the Nzoia, Yala and Nyando river basins through adoption of an integrated ecosystem management approach				
PDO Outcome Indicator				
Decreased number of food-deficit months per annum (% of 12 months)	75 (equivalent to 9 months)	60 (equivalent to 7.2 months)	36 (equivalent to 4.3 months)	The impact assessment study reported the approx. 5 months of shortage of both maize and meat. Maize shortage months decreased from 5.3 to 4.3 months in target households while non-Project participants reported an increase of food-deficit months (from 4.9 to 5.4 months) between 2004 and 2009.
Percentage of households in Project intervention areas that are satisfied with Project interventions	65%	90%	90%	About 90% of the households were satisfied with Project interventions according to adoption/stakeholder satisfaction studies study conducted from November 2008 to February 2009.
Number of direct Project beneficiaries (% of which are women)	16,000 (50% women)	24,000 (50% women)	40,000 (70% women)	Target exceeded.
GEO: Promote a set of integrated ecosystem management interventions so as to achieve local and global benefits				
GEO Outcome Indicators				
Area reforested for carbon sequestration	560	1,200	1,820	Estimated based on 2.6 million tree seedlings planted with 70% survival rate, assuming 1,000 seedlings population per hectare.
Decreased incidence of soil erosion in Project intervention areas	60%	45%	45%	The baseline value is based on the number of clusters observed to be erosion prone during the initial biophysical baseline inventory in 2006. Actual value is based on the observed incidence of erosion within micro-catchment clusters after construction of soil and water conservation structures under the Project.

Component 1: Capacity Building for Community Driven Integrated Ecosystem Management

1. The Project has effectively adopted micro-catchment based approaches to implementation and has established organized community structures under the stewardship of elected micro-catchment committees to coordinate the planning process and integrate activities related to sustainable ecosystem management that transcend local administrative boundaries. Each micro-catchment committee developed a PAP to identify priority activities to be implemented and define responsibilities, timeframe, monitoring indicators and cost estimates for implementation. About 7,500 households (close to 40,000 people) in 15 micro-catchments have collaborated with the Project over the last five years. Committees were trained on various ecosystem management strategies,

leadership and group dynamics to enhance their capability to coordinate activities in their respective micro-catchments.

2. Memoranda of Understanding (MoUs) have been signed between the Project and some NGOs, such as VI Agroforestry, Victoria Institute for Research on Environment and Development (VIRED) International, CABI Africa, Inter Diocesan Christian Community Services and local University departments to undertake specialized studies including carbon stock measurements for climate change, sustainable wetlands management, integrated pest management and adoption/stakeholder satisfaction studies. Both institutional linkages and informal networks were characterized by joint planning and implementation (including field visits), division of tasks, and sharing of information and resources. As a result, most sub projects initiated by the Project were backstopped by key GoK departments, leading NGOs and local universities.

3. Subcomponent 1.2 on enhancing capacity for developing carbon finance proposals experienced long delays due to the change in the implementation protocol which required time for the new arrangements to be operationalized. While an inventory of current stakeholder capacity in the region was documented and the Western Kenya Climate Change Adaptation and Mitigation Forum was established, the capacity of KARI, local institutions and communities that was strengthened under the Project is still limited in terms of measuring carbon stocks and accessing the global carbon markets.

Indicators	**Baseline Value**	**Target Value**	**Actual Values Achieved**	**Remarks**
	June 2008	**June 2010**		
Number of community participatory action plans (PAPs) developed at micro-catchment level	11	15	15	
Community participation in assessment planning, decision making, implementation , and evaluation of IEM activities (measured in % of households)	75%	90%	90%	This figure refers specifically to the percentage of target households with whom the Project directly engaged. The percentage may be slightly lower for other households who learn from the Project intervention sites and other technology transfer agents.
Participation of local and regional institutions in planning and coordinating ecosystem management activities (% of identified relevant stakeholders)	75%	95%	95%	The institutions referred to here include Government departments, NGOs, CBOs and other relevant operators within the Project implementation areas.
Number of Project ideas on carbon finance developed in Project intervention areas	0	1	1	Target met.

Component 2: Scaling up and Financing IEM interventions

4. 82 percent of PAPs have been implemented according to plan. A total of 115 community-managed tree nurseries have been established within 15 operational micro-catchments, and a total of 2.6 million tree seedlings of assorted species were planted on farms. 48 model farms

promoting IEM strategies have been established within the Project area. 2,200 hectares of land were brought under sustainable land management through interventions such as terracing, retention ditches and drainage, and construction of water pans.

5. Despite the significant progress and results, financial flow constraints adversely affected the adequacy and sustainability of the achievement of PDO. 98 sub-projects developed by community groups in the lower Yala and Nzoia river basins received grants of a total of US$ 0.12 million shortly before the Project closure, after awaiting financing for nine months since the respective subprojects had been approved. 65 sub-projects in the upper and middle Nyando have never been vetted due to the lack of available funds. Slow disbursement also affected implementation of timely planting activities during rainy seasons and exchange visits of community groups which, as a result, were not realized to the extent as planned.

Indicators	Baseline Value	Target Value	Actual Values Achieved	Remarks
	June 2008	June 2010		
Percentage of PAPs implemented according to planned schedule	40%	70%	82%	Target exceeded.
Hectares of land brought under SLM interventions	560	1,200	2,200	The figures show the areas where planted trees and crops survive based on periodical (bi-annual) survival rate counts.

Component 3: Monitoring & Evaluation and Project Management

6. 87 percent of the Project fund was disbursed two months before the end of the grace period and all the outstanding bills were paid. 90 percent of planned activities were completed by the end of the Project closure. However, the prolonged delays in the disbursement of funds affected the timely procurement and implementation of this component. The MIS was developed and successfully installed only at the end of the fourth year. As a result, it was, however, not fully operationalized due to the winding up of activities and cash flow problems during the last year of Project implementation. Project staff felt that more time was needed to practice with the system before they acquired the confidence to use it.

Indicators	Baseline Value	Target Value	Actual Values Achieved	Remarks
	June 2008	June 2010		
Methodology for carbon and other GHG emission measurement developed and baseline available	No methodology available	Complete	Complete	Achieved.
Number of experts in participating institutions with capacity to monitor changes in carbon stocks	0	10	10	The Project formed a consortium of experts with partnering institutions which have capacity to monitor carbon stocks. Target met.
MIS developed and operational	TOR prepared	Complete	Developed, staff trained & software	MIS developed but not fully operational with significant delay.

Indicators	Baseline Value	Target Value	Actual Values Achieved	Remarks
	June 2008	June 2010		
			installed	
Percent of disbursements executed according to cost and timeframe specified in the disbursement schedule	45%	80%	92%	The total disbursements for the Project amounted to US$3,784,950.64 (92.32%). Target met.
Percent of procurements executed according to cost and time scheduled specified in the procurement plan	30%	95%	95%	Target met.
Percent of activities executed according to time schedule specified in the work plan	60%	90%	90%	Target met.

Annex 4: Economic and Financial Analysis

1. Introduction

Approximately the same analyses carried out ex-ante at the time of project appraisal were undertaken to assess its financial and economic viability ex-post. Given the difficulty of quantifying benefits of certain ecosystem interventions, as well as of observing visible change in outcomes shortly after interventions, the analysis was confined to a sub-set of IEM activities that communities adopted.

Three types of analysis have been carried out:

- A financial cost-benefit analysis to assess the profitability of the technologies at the household level;
- An economic cost-benefit analysis to assess the economic viability of IEM interventions at the Project level; and
- A social cost-benefit analysis to include other externalities such as carbon sequestration.

The analysis presented here is a summary of a more detailed working paper that can be found in the project file.

2. Methodology and Basic Assumptions

The bulk of the field work for this assessment comprises the collection of data using a structured questionnaire from 362 randomly selected households from the 11 micro-catchments in the three lower blocks of the Nyando, Yala and Nzoia rivers.

The specific types of intervention that were investigated are the following:

- Trees (timber, fruits, fodder)
- Maize (through soil and water conservation)
- Banana (tissue culture varieties)
- Vegetables (Kale)
- Bee keeping (honey)
- Tree nurseries
- Water pans
- Livestock (improved dairy goat and poultry)

Tree planting. The survey captured the number of trees each household had at the start of the project and the number planted over the Project period. Hence, the ex-post assessment compares changes in adoption and numbers of trees planted during the project period between beneficiary and control households. Trees were differentiated by type and those analyzed were timber, fruit, fodder and trees for soil conservation.

Bee keeping with improved hives. The adoption and level of improved hives was captured by the survey. Since these were not present in the area before the Project, all current adoption can be assumed to be the result of the Project.

Maize. The Project did not promote new maize varieties or agronomic practices, but did promote the uptake of many different sustainable land management practices. Comparisons of mean maize yields between beneficiary and control households did not show any positive impacts from the

project so no benefit is reported in the ex-post economic analysis. However, given the significant differences in adoption of soil management practices, modest economic benefits (35% yield increase in year 7 and 40% in year 15) were included in alternative scenarios (scenarios 2 and 3), based on trial results coupled with actual adoption rates from the surveys.

Tree nurseries. The total amount of revenue and income from nurseries during the Project is estimated from records tracking the numbers of seedlings raised and payments made. Post project revenue from nurseries was estimated to be much lower on the assumption that, while under implementation, the Project itself had been the principal source of local demand. During the Project, about US$167,000 in net income accrued to households for seedling production efforts. In the analysis, this was divided equally among the last three project years. Following the Project, it was assumed that initial production would be just 10% of that during the Project, and then slowly increase in year 8 and again in year 13.

Water pans. Livestock watering and labor time saved was estimated to constitute main economic impacts. Field officers estimated that about 600 livestock were watered on a near daily basis. An average herd size of five is assumed (based on the household survey) and watering for 300 days with a savings of a half day in each time (KES50 per day per herd).

Livestock. Data were collected on goat milk production, chicken production, and egg production. However, the analysis did not detect any difference between beneficiary and control households at project completion. This is due to the small number of adopters in the Project areas, given the mode of dissemination was to introduce few numbers of improved males for breeding in the communities. The process of upgrading livestock takes time, even when successful. For this reason, livestock benefits are not included in the following analyses.

2.1 Financial analysis

Household economic analyses were conducted using a 22 year horizon with discount rate of 12%. Costs and output prices were collected through focus group discussions, key informant interviews, and secondary data. Net discounted costs and benefits were then estimated for each intervention area from which net present values (NPVs), benefit-cost ratios, and economic as well as social rates of return (ERR and SRR) were derived.

Underlying scenario. The following three scenarios were used for analysis. In either scenario, it was assumed that benefits of interventions are accrued since the third year of the Project.

Scenario 1: the most conservative scenario which assumes no change in production increases (for banana, kale, honey, maize) or in adoption (timber, fruit and fodder trees which have yet to produce benefits) over time.

Scenario 2: an increase over time in the level of adoption for those households which already have adopted a specific intervention.

- Timber: 25% more planted in year 12
- Fruit: 25% more planted in year 7
- Fodder: double the quantity planted in year 7
- Banana: double the quantity in year 7
- Kale: double the quantity in year 7
- Bee keeping: quadruple quantity in year 7
- Maize: increase yields by 35% in year 7 and by 40% in year 15

Scenario 3: the same assumptions as scenario 2 but doubling the adoption rate for kales, banana and honey (adoption rates for trees are identical in scenarios 2 and 3).

- Timber: 25% more planted in year 12
- Fruit: 25 % more planted in year 7
- Fodder: double the quantity planted in year 7
- Banana: double the quantity in year 7 and double the adoption rate
- Kale - double the quantity in year 7 and double the adoption rate
- Bee keeping quadruple quantity in year 7 and double the adoption rate
- Maize: increase yields by 35% in year 7 and by 40% in year 15 and double adoption rate

These more optimistic scenarios are plausible based on experiences with farmer adoption behavior which indicates a strategy of incremental adoption for these types of investments in Kenya. It is also justified by the fact that beneficiary households stated that the Project had greatly increased their knowledge in IEM practices, as compared to that of the control group.

As noted above, left out of the calculations were impacts on livestock (improved poultry and dairy goats), as these differences could not be detected in the survey.

2.2 Economic analysis

Project level impacts were calculated by first multiplying the household level impacts for each IEM practice (the difference in NPVs between beneficiary and control households) by the percentage of beneficiary households adopting the practice to arrive at an average impact across all beneficiary households. These were then added up to form a total household level impact. This was then multiplied by the number of beneficiary households to arrive at a project level figure. To that, the net benefits from tree nurseries and water pans were added which were calculated independently at the project level.

Number of beneficiary households. The project appraisal document assumed the Project would work in all nine blocks envisaged and that in each block there were a total of 7500 households. However, the Project concentrated its efforts in five blocks after the MTR and it was estimated that the total number of households is considerably less based on population density and household size variables (the latter collected from the surveys). A total of 12,962 households were estimated to reside in the three lower blocks and about 9,570 resided in the Project's micro-catchment areas. Of this target population, the survey results revealed that about 41% or 3,951 households benefited directly from the Project in the three lower blocks. For the remaining two blocks (Middle and Upper Nyando), field officers estimated that a total of 500 households was active in the Project. This was added to provide a total of 4,451 households (roughly close to 20,000 beneficiaries) benefiting from the Project. The discrepancy in the number of beneficiaries from what was reported by KARI (40,000) comes from the fact that the analysis excluded ones who had informal/ad-hoc interaction with the Project.

Project costs: It was estimated that Project costs of US$3,784,951 (final disbursed amount) were evenly distributed over the five years of Project implementation. All costs borne by households, including establishment, maintenance, and harvesting, were already included in the household-level analysis so that the resulting NPVs represented net of those costs.

In addition to the economic assessment, two social impacts, food security and knowledge gain, were also considered. On the environmental side, a quantitative estimate was made of the impact on carbon sequestration. The increased adoption of many sustainable land and soil management practices was also documented. However, other than a valuation of carbon sequestration, the

assessment did not include external impacts (e.g., off-farm income effects through market linkages) mainly because these are likely to be negligible at the time of Project completion. Moreover the analysis of potential multiplier effects (e.g., timber milling) would have required significant additional effort that was not possible to undertake in the follow up period for this assessment.

3. Results

3.1 Financial Analysis

Change in adoption rate. Table 1 shows a greater increase in adoption rates of tree planting activities among beneficiary households compared to the control groups (timber trees and fruit trees: 23% increase in adoption before/after the Project; fodder trees: 39%; and soil fertility trees: 40%). The table also shows that current adoption levels of bee keeping, kale and bananas remain fairly low among beneficiary households, between 4.9 and 13.9%. For trees, it is possible to calculate the Project effect on adoption, by comparing the change in adoption rates among beneficiary households against that among control households. This was done for the four main tree types and the results presented in the table show that the Project did have a large effect in terms of influencing adoption by between 20 and 33%.

Table 1: Change in adoption rate

Intervention Area	Adoption rate (%)				Project effect on adoption
	Beneficiary households		Control households		
	Before the Project	During the Project	Before the Project	During the Project	
Timber trees	69.7	92.6	86.6	76.8	32.7
Fruit trees	54.1	77	67.9	70.5	20.3
Fodder trees	13.9	53.3	8	21.4	26
Maize / bean through					
Soil fertility trees	13.9	54.1	12.5	25.9	26.8
Soil conservation	NA	41.3	NA	30.5	NA
Other soil fertility investment	NA	34.7	NA	23.2	NA
Banana	NA	13.9	NA	23.2	NA
Vegetables (Kale)	NA	12.3	NA	17	NA
Bee keeping	NA	4.9	NA	0.9	NA

Table 2 shows the difference in production that was detected between beneficiary and control households. For trees, it shows the mean difference in the number of trees planted per household. For banana and kale, the yield per acre is shown, which is in turn converted to the total yield per household using the average area cultivated for these crops. For bee keeping the mean difference in honey production per household was estimated.

NPV per household. Overall, under the base scenario 1, the NPV per household was estimated to be US$1,198 across all beneficiary households including those who may not have adopted those interventions. In scenarios of increased adoption over time, the NPV per household increased significantly, to US$1,963 and as high as US$2,844.

The results indicate that the bulk of estimated net benefits will come from timber trees, fruit trees, and bee keeping, in order of importance, under scenario 1. If relatively minor increases in adoption were to occur among various intervention areas, then bee keeping could emerge as the main contributor to income. Timber tree planting is somewhat less attractive in terms of NPV because of the delay to maturity and benefits realization.

Table 2: Net Present Value per beneficiary household

Intervention Area	Average difference in production*	NPV per household (US$)		
		Scenario 1	Scenario 2	Scenario 3
Timber trees	149.1 trees	571.91	613.51	613.51
Fruit trees	4.2 trees	333.58	390.79	390.79
Fodder trees	57.7 trees	0	77.76	77.76
Maize / bean through	0**	0.00	10.44	20.88
Soil fertility trees	48 trees			
Soil conservation				
Other soil fertility investment				
Banana	20.7 kg/acre	66.99	135.90	271.80
Vegetables (Kale)	187 kg/acre	34.55	69.09	138.19
Bee keeping	5kg/farm	191.72	665.41	1330.82
Total Net Present Value per household		1198.74	1962.91	2843.75

* For trees, calculated over 5 different methods

** For maize, it is assumed in scenarios 2 and 3 only that the combined soil management practices increase yields by 35% starting in year 7 and by 40% in year 15.

3.2 Economic Analysis

Household-level NPV was aggregated by multiplying the number of beneficiary households in the three blocks (3,951 households). By adding the estimated NPVs from tree nurseries and check dams, the total NPVs in the three blocks were between US$5.4 and US$11.9 millions (Table 3). Then, the additional net benefits accruing to the 500 households in the Middle and Upper Nyando blocks were aggregated by applying the average household NPV from the three lower blocks to these additional households, due to the lack of data that better reflected impacts in those blocks. This increases total project NPV accruing to households to between US$6.0 and US$13.3 millions.

Economic rate of return. Under the base scenario 1, the overall NPV at the project level taking into account the project costs was US$3.0 million resulting in a benefit-cost ratio of 2.02 and an ERR on investment of 17.7%. In the economic analysis at Project appraisal, it was projected that an ERR of 23% was achieved if the Project were to be implemented in all nice blocks, each having target households of 7,500. However, an alternative scenario, assuming the decreased number of beneficiaries (about 20,250 households), was also tested in the ex-ante analysis, which was much closer to actual situations where about 20,000 households were estimated to reside in the five blocks. The latter scenario provided an ERR of 14%. Thus, an ex-post ERR of 17.7% gives a sound rationale that the Project efficiency was satisfactorily achieved as originally envisaged.

Table 3: NPV and economic rate of return at project level

Intervention Area	Aggregated benefits in the three blocks (US$)			Total impacts in all five blocks (US$)		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Timber trees	2,259,550	2,423,917	2,423,917			
Fruit trees	1,317,923	1,543,984	1,543,984			
Fodder trees	0	307,206	307,206			
Maize (through soil improvement)	0	41,241	82,482			
Banana	264,659	536,929	1,073,858			
Vegetables (kales)	136,486	272978	545,956			
Bee keeping	757,455	2,628,958	5,257,915			
Total Household NPV	4736073	7,755,213	11235318			
Tree Nursery Net Income	171,344	171,344	171,344			
Water pans	475,070	475,070	475,070			
Total Tangible Project Benefits	5,382,487	8,401,627	11,881,732	5,981,856	9,383,080	13,303,606
Project Costs (present value)				2,955,354	2,955,354	2,955,354
Project NPV				3,026,502	6,427,726	10,348,252
Project Benefit Cost Ratio				2.02	3.17	4.50
Project ERR				0.177		

3.3 Social Analysis

Food security and welfare. Questions were asked of all respondents with respect to the number of food deficit months, overall food production, purchasing and consumption, and the extent of ownership of various assets as of 2004 and 2009. From these responses, changes over time were calculated for beneficiaries and control groups.

Table 4 shows the average decrease in the number of maize and meat deficit months in beneficiary households. In the case of maize, the decrease was large, at one month. On the other hand, control households experienced an increase in maize deficit periods, by almost half a month and had no change in meat deficit months. These statistics indicate that the Project had a considerable positive impact on food security. This is further supported by the other food security indicators: nearly 60 % of beneficiary households indicate an increase in the production and consumption of food over the period. This compares favorably with control households for which only 31 to 37% have experienced such positive outcomes.

A number of assets were also enumerated and changes in their holdings across project and control households were analyzed. Some assets, such as motorbikes and bikes, did not change over the period for any of the groups. However, changes were detected in mobile phones, improved stoves, and radios as presented in Table 4. Mobile phone ownership grew for all household types, but more rapidly among beneficiary households than for the control group. The same applies to improved stoves. For radio ownership, the figures show an unchanged situation for beneficiary households against a slight increase for control households. It is not known, however, whether the improved asset holdings for mobile phones and improved stoves (compared to the control group) are a result of additional income from the Project or from other factors.

Table 4: Comparisons of food security and welfare indicators

Food Security and Welfare Indicator	Beneficiary households			Control households		
	2004	2009	Difference	2004	2009	Difference
Maize deficit months	5.27	4.33	-0.94	4.91	5.35	0.44
Meat deficit months	5.71	5.41	-0.3	4.57	4.56	-0.01
% producing more food 2004-09			0.59			0.37
% buying more food 2004-09			0.37			0.6
% eating more food 2004-09			0.59			0.31
Mobile phone - % owning	0.37	0.72	0.35	0.41	0.62	0.21
Improved stove - % owning	0.32	0.41	0.09	0.25	0.28	0.03
Radio - % owning	0.78	0.78	0	0.74	0.77	0.03

Knowledge Gains. Households were asked to evaluate the change in their knowledge of tree planting, soil management, crop management, and livestock management during the project period. Without exception, beneficiary households were much more likely than other households to have responded that their knowledge increased significantly (Table 5). Conversely, the control households were much more likely to respond that their knowledge had decreased or remained unchanged. As an example, 87% of beneficiary households stated that their knowledge of tree planting had increased while only 55% of control households responded similarly. Households were also asked about their gain in knowledge with respect to the marketing of outputs and accessing information. Again, beneficiary households were much more likely to have gained knowledge. As many as 97% of these households felt that their knowledge on how to access information had improved, as compared to only 54% of control households. In all cases, the knowledge gain of households which were not members of IEM target groups but had informal/ad-hoc interaction with the Project, was in between the case of beneficiary and control households. Thus, those households also appear to have benefited from the Project.

In summary, the data on knowledge gain is important in evaluating the potential for sustaining the existing investments and in undertaking new investments in the future. The capacity of households to invest in IEM has clearly been raised. However, other factors, such as economic incentives and local institutional support, will also determine the extent to which these investments will be sustained or upscaled.

Table 5: Knowledge gain among different types of households (unit: number of households)

Knowledge category	Decreased	No change	Increased slightly	Increased significantly	Total
Tree planting management					
Beneficiary Household	3	13	45	60	121
Households with Informal Interaction	4	26	69	27	126
Control Households	9	40	48	11	108
Soil management					
Beneficiary Household	0	13	61	48	122
Households with Informal Interaction	2	29	74	21	126
Control Households	5	43	55	7	110
Crop management					

Beneficiary Household	2	7	63	50	122
Households with Informal Interaction	0	16	85	25	126
Control Households	18	22	64	6	110
Livestock management					
Beneficiary Household	8	8	80	25	121
Households with Informal Interaction	5	25	78	18	126
Control Households	21	28	55	6	110
Marketing information					
Beneficiary Household	6	20	66	30	122
Households with Informal Interaction	8	23	82	13	126
Control Households	23	35	48	4	110
Information access					
Beneficiary Household	0	4	67	50	121
Households with Informal Interaction	4	10	87	25	126
Control Households	13	37	41	18	109

3.4 Environmental Analysis

Soil erosion. From Table 1, it is clear that beneficiary households were much more inclined to invest in these IEM practices. Some of the impacts of these investments can be traced to private economic returns, either actual or projected. However, beyond the private returns, positive environmental impacts are expected as well. Many of the soil conservation measures entailed technologies for reducing erosion, such as terracing, ditches, vegetative strips, minimum tillage, improved fallows, and others. For each of these practices, beneficiary households were more likely to adopt these measures than control households. Many of the differences were about 10% in size, but some were larger, such as in the case of vegetative strips where the adoption rate was 61% by beneficiary households and only 41% by control households. Indeed, the survey indicated that beneficiary households reported far fewer incidents of soil erosion than did control households during 2006 and 2009. For example, the mean number of incidents per household ranged from 1.7 to 5.7 over the four year period for beneficiary households, while the range was between 4.8 and 17.2 for control households. The four year average was 3.3 for beneficiary households and 9.0 for control households.

Carbon sequestration. Tree planting offers another way of helping to prevent erosion and protect watersheds. In addition, it can help to foster biodiversity (e.g., of birds) and sequester carbon. After removing a couple of outlier tree planters, across all types of trees, beneficiary households planted an average of 440 trees during 2004 and 2009, as compared to 127 for control households. The additional 313 trees can potentially sequester significant amounts carbon depending on the type of tree and management system. In the ex-ante economic analysis, the emphasis was on rotational shrubs and permanent shrubs which were repeatedly pruned. Those were assumed to generate 6 kg of carbon per year. On the other hand, the types of timber trees planted by the Project can produce upwards of 30 kg of wood per year under favorable growing conditions and management, or about 15 kg of carbon per tree. However, since many of the trees are found in a less favorable environment in lower Nyando, a more conservative estimate of 10 kg per tree was used. The total of nearly 160 additional timber and fruit trees can be expected to sequester about 1.60 tons of carbon per year which could provide an additional US$23 per year per household than would be generated by control households (at a price of US$4 per ton of carbon dioxide, where one ton of carbon equals 3.67 tons of carbon dioxide). Across all beneficiary households, this

would amount to a NPV of about US$751,946 for timber and fruit trees. The NPV for fodder and soil fertility trees would be approximately US$431,768.

Biodiversity. Potential biodiversity benefits from the Project can be measured through: (i) additional wildlife (plants and animals) extraction benefits that would accrue to households in the project area as a result of the Project; (ii) wildlife stock accumulation benefits in natural habitats, that would accrue as a result of the Project, with estimation based on the stock value of endangered or threatened wildlife species; and (iii) the change in long-term livelihood sustainability or disaster mitigation benefits of biodiversity for food, fiber and human health. However, not enough data was attainable to estimate the benefits from biodiversity increase.

Lake Victoria. The intervention of the Project in the five blocks covering less than 2% of the total watersheds area in Western Kenya, is unlikely to generate any significant decline in sediment loading that would have a perceptible impact on the economy of the Lake Victoria. At best the SLM technologies and the planting of trees on degraded lands would improve water quality in the micro-catchments where the blocks are located, but would have no significant impact beyond such catchments.

Social rate of return. Given the above assumptions, the social rate of return for the Project which included the environmental benefits from carbon sequestration was estimated to be 19.3%.

Annex 5. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Berhane Manna	Sr Agriculturist	AFTS2	Task Team Leader
Andrew Karanja	Agricultural Economist	AFTS2	
Yves Coffi Prudencio	Lead Operations Officer	AFTS2	
Julian Dumanski	Consultant		
Melissa Brown	Junior Professional Associate	AFTS2	
Dahir Warsame	Procurement Specialist	AFTPC	
Enos Esikuri	Environment Specialist	ENV	
Christophe Crepin	GEF Coordinator, AFR	AFTS4	
Moses Wasike	Financial Management Specialist	AFTFM	
Hyacinth Brown	Sr Finance Officer/Legal Counsel	LOAG2 LEGAF	
Jaime Webbe	Junior Professional Associate	AFTS4	
John Boyle	Environment Safeguards Specialist	AFTS1	
Roxanne Hakim	Social Safeguards Specialist	AFTS2	
Sandra Jo Bulls	Team Assistant	AFTS2	
Christine Cornelius	Lead Operations Officer	AFTS2	
Wendy Wilstshire	Operations Analyst	AFTS2	
Lucie Muchekehu	Program Assistant	AFMKE	
Supervision/ICR			
Christian Peter	Sr Natural Resources Management Specialist	AFTEN	Task Team Leader
Junko Nishikawa	Jr Professional Officer	AFTEN	ICR Primary Author
Sandra Jo Bulls	Program Assistant	AFTEN	
Maina Gathu	Consultant	AFTED	
Helene Gichenje	Consultant	AFTEN	
Jane A. N. Kibbassa	Sr Environmental Specialist	AFTEN	
Geoffrey John King	Consultant	AFTEN	
Berhane Manna	Sr Agriculturist	AFTAR	Task Team Leader
Edwin Nyamasege Moguche	Consultant	AFCE2	
Joel Buku Munyori	Procurement Specialist	AFTPC	
Ernestine Ngobo-Njoke	Language Program Assistant	AFTEN	
Tom Mboya. Owiyo	Consultant	AFCE2	
Banumathi Setlur	Operations Analyst	MNSEN	
Nyambura Githagui	Sr Social Development Specialist	AFTCS	
Henry Amena Amuguni	Financial Management Specialist	AFTFM	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	US$ Thousands (including travel and consultant costs)
Lending		
FY02	4.09	34.04
FY03	16.04	69.37
FY04	25.31	166.93
FY05	19.76	51.03
Total:	65.20	321.37
Supervision/ICR		
FY06	9.52	77.60
FY07	22.80	128.50
FY08	22.48	136.34
FY09	6.19	33.24
FY10	5.74	38.32
FY11	4.56	43.41
Total:	71.29	457.41

Annex 6. Beneficiary Survey Results

Objectives and survey design

The beneficiary survey was conducted to assess the impact of the Project on the community's attitudes, perceptions, beliefs, experiences and reactions after a five year period and determined the extent to which the objectives were achieved. A total of nine focus group discussions (FGD: three in each block) were conducted in the Project intervention areas and an FGD check list/guideline and an observation checklist were used to collect data.

Main findings

1. Participatory Action Plans

We sought to find out whether the communities could identify the ways in which they and partner organizations were involved with the Project. The members during the discussions could identify the organization and the Project, i.e. KARI and WKIEMP. Focus groups in all three blocks were in agreement that they were involved from the beginning of the Project. The initial activities included problem identification, selection of demonstration sites, community empowerment with respect to Project activities and strengthening and formation of farmers' groups in integrated ecosystem management.

Information obtained from the communities revealed that the groups ranked Kenya Forest Services as the strongest collaborator of the Project at 18% of the total number of organization mentioned by different groups, Ministry of Agriculture and Other Farmers Associations placed second at 14%, Community Based Organizations, Ministry of Livestock and Local Government Authority at 9% while youth organizations and disabled welfare groups followed at 5% each. For Project adoption and sustainability, collaboration is of growing importance, especially in terms of having related organizations work together in order to achieve substantial results.

Several training sessions were organized by KARI through the Project lifecycle. With respect to the adoption of new skills as a result of the training sessions, 50% of the groups responded that they had partly implemented these skills, while the other 50% noted that they had not. About 30% of the groups attributed this poor response to lack of funds, 14% attributed their failure to implement the lessons learnt to poor leadership skills of the farmers' associations where groups' financial resources were squandered away, and another 14% were influenced by cultural practices and beliefs. For instance in the Dhene micro-catchment, the farmer's group refused to have its hens taken to one homestead where the Kenbrew was being kept for purposes of cross-breeding. Respondents believed this would go against their beliefs where it is believed that the hens would die if one crossed the road while carrying them. Competition for resources was also mentioned as a reason for not implementing new skills as were pests and disease together with salty water that hindered adoption of new farming techniques at 14% and 21%, respectively. Another minor challenge was resistance from community members who did not participate in Project activities.

The farmers agreed that soil conservation measures and learning as to how to plant trees were the most practiced lessons at 13% of the different skills taught, while conflict resolution and poultry keeping were both mentioned at 11%. Modern farming techniques, livestock keeping and bee keeping were also gainful skills that the community had attained from the Project at 9%. Surprising as well were lessons participants had learnt with respect to climate change and its effects at 6%, while integrated pest management skills had been learned by 4.8%. As for river

bank protection, this activity was mentioned at one site where sand harvesting was prominent (a micro-catchment in the lower block of the Nzoia river).

2. Impact of IEM technology adoption

It is very encouraging to see the extent to which tree planting has been adopted throughout the three watershed sites. Information gathered during the discussions indicated that community tree nurseries had been set up in farms that belonged to individuals, which were the demonstration sites. From the demonstration sites the tree seedlings were distributed to the farmers. Other knowledge gained concerned the basic importance of trees and their benefits. Rehabilitations of the environment were underway in a vigorous manner as a result of several woodlots such as one in Namduru. The trees have also provided fodder for the livestock, thus reducing the time and energy previously required to look for grazing land.

The communities have adopted cultivation of new crops recommended by KARI. Butter nuts, water melon, certified maize, amaranth and eggplant have proven to be very popular with the local populations around Kapsiti Katuk, Onyuongo and Kapsokale. Others, notably the communities around Kapsiti Katuk, have taken advantage of the income generating capabilities of these crops and transport them all the way to Kisumu to sell. Famers have reported that they have noticed some positive effects on cultivating these crops by adopting the knowledge they obtained during training sessions. The intensity of soil erosion has been reduced in Kapsiti Katuk and Onyuongo, although in Kapsokale the case is not the same. Farmers were able to tell the improvement of soils on the basis of increased food yield and the color of the soil, which has changed from brown-yellow to dark-brown. One particular farmer gives an example that, before he would harvest about half a sack of maize (i.e. about 25kg), but now with the adoption of new farming techniques and environmental conservation measures, he is able to harvest about two sacks of maize (about 100kg).

According to the groups, environmental conservation management technologies have proved to be a better way of land management. Impact of these technologies include increased food yield, hence improved household food security, at 23% of the different impact identified by the farmers, improved environment, especially availability of windbreaks at 31%, availability of cheap green manure from the trees planted at 13%, availability of wood fuel from the enclosure at 10%, new opportunities for income generation and hence improved welfare of the family at 15%, and finally, more activities and less idleness for youth at 7%.

3. Gulley rehabilitation and water pan development

The major problems stemming from the large gullies in Nyando are communication and transportation interruptions between communities, accidents, injuries and death to human beings and livestock, hunger and poverty, loss of land for a graveyard, and forced migration. Before the Project, community members of Onyuongo and Kapsokale tried to implement some measures to stop the growth of the gullies. The activities included putting in place terraces along the hills and cut-off drains. The Project tackled some of the problems mentioned by the community members though the extent to which the problems were dealt with could not be easily quantified. In Kapsokale, not much was done due to lack of funds. What the Project was able to do was to introduce new farming techniques, new crops and tree seedlings. In this site, neither a water pan nor an enclosure could be established around the gulley in order to stop it from growing. From the villagers' perception, the gulley had expanded even further and deeper in recent times. Recently, one farmer had lost part of his farmland due to the growing gulley.

As concerns enclosures, of the three sites visited in lower Nyando, there were only two enclosures i.e. Kapsiti Katuk and Onyuongo. Managing and maintaining these two enclosures seemed to be a challenge to the communities even though both had tried to put some mechanisms in place to deal with those that broke into the restricted areas and misused the resources in the enclosure. These two communities created by-laws on how to govern these enclosures although some people still knowingly break-in and contravene the laws, especially during the dry season. If approached and asked to stop this, they wouldn't compromise. In Kapsiti Katuk, this has led the farmers to approach the local authority to deal with these offenders. A major obstacle, however, is that some of the offenders own part of the land housing the enclosure so that punishing them becomes tricky. In Onyuongo, the enclosure was fenced at a distance of around 50m from the gulley, even though the gulley has grown so close to the fence that local people fear that the enclosure will not be able to contain the growth of the gulley. What has remained is a small foot path of about 10m between the gulley and the edge of the enclosure and the locals are anxiously waiting to see what will happen.

There were constraints in the adoption of these technologies around the gulley sites including lethargy of community members who do not want to participate in work such as fencing the enclosure. Cultural beliefs and practices also prevented full adoption of these technologies in the gulley sites. Unreliable rainfall patterns and pest and disease also proved to be a challenge to the community. Increased wildlife in the enclosures led to crop damage on nearby farms which was also a huge problem. The locals noted that, as a result of the rehabilitation of the once degraded ecosystem, animals, such as monkeys and porcupines, and birds have returned to the area which they had earlier deserted.

Establishment of water pans was one of off-farm activities undertaken by the Project. One full fledged water pan was set up in Kapsiti Katuk. In Onyuongo, the process was never completed while, in Kapsokale, this initiative was not undertaken. The varied level of implementation was attributed to the lack of funds. Before the establishment of the water pan in Kapsiti Katuk, local people had to travel for over 6km in search of water. Thus, the water pan has provided water for both farm and household use.

Conflict in these three particular gulley sites arose over management of water pans and enclosures. During the FGD site visit, it was noted that the CDF committee had stepped in to finish up the construction of a water pan in Onyuongo, although there is already a concern as to how the facility will be managed and governed. Even though the two aforesaid communities did have by-laws that they hope to implement in governing the management and usage of the water pan and the enclosure, they did not know who would be part of the governing structure and whether it should be attached to the existing farmer association committee or be established independently. The water pan in Katuk Kapsiti de-silting was also proving to generate conflict. Some accused others of being responsible of silting the waters, yet they did not want to be part of the de-silting exercise and consequently, the farmers did not know how to manage this problem. As for the enclosure, it raised conflict as some farmers who owned part of the enclosure sought to use it as they pleased even though they had agreed that they would keep off it for the time being until full rehabilitation was attained.

Political instability during 2008 was also an obstacle to adopting these skills. In one particular demonstration site in Kapsokale, which was the assistant chief's own farm, during the 2008 post-election violence that had rocked the country, everything was lost because of his support to a political candidate that his neighbors did not support. In return, he did not want anyone to use his

farm even though everyone had participated in establishing it during the demonstration exercise. Similarly, in Katuk Kapsiti the water pan is shared between two communities and during political clashes the members supporting one of the parties were not able to utilize it.

4. Conflicts and resolutions

In addition to the conflicts arising from communally managed resources noted above, a few others were noted in the FGDs. In Yala and Nzoia, conflicts with the Project emerged over non-payment for tree seedlings raised by the respective communities. This occurred in the final stage of the Project when funds were not released to the Project team in a timely manner. Other conflicts within the communities emerged from mismanagement of funds and distribution of farm inputs provided by the Project. During the Samadhi Luore and Nyanya Micro-catchment group discussions, meetings were stopped abruptly by hostile youth groups. It is believed that the youths of this particular micro-catchment obtained a loan in order to produce as many seedlings as possible which KARI 'bought' with promise of payment at a later date. Two years later, due to cash flow problems within the Project, the payments were not completed. Not only did this result in conflict within the groups, but it demoralized the farmers and also tarnished the tremendous progress that KARI had attained through the Project. Other causes of conflict in these two areas included community mismanagement of funds and farm inputs donated by the Project, lethargy of group members, divergence of farm yields from demonstration site results, lack of water for farming, lack of attendance during group meetings, scarce resources and mistrust among group members/poor leadership.

In terms of whether they had sufficient skills to resolve such conflicts, 33% of the groups said that they had no knowledge whatsoever while 67% said that they had limited knowledge to resolve conflicts. Additionally, 25% of the groups would resolve the conflicts by using the group constitution while another 25% would seek local authority's intervention. On the other hand, 12% would simply not attempt to resolve the problem and another 38% preferred to dissolve the farmers groups as a solution to resolving the conflict.

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

I. Summary of Borrower's ICR

The Borrower (KARI) has prepared a detailed ICR following the Bank's template, which is available in the project files. The following summarizes the main findings and assessment of Project outcomes.

Assessment of Outcomes

1. Relevance of Objectives, Design and implementation

The two objectives of the project (developmental and environmental) are consistent with the government's SRA to improve agricultural productivity, food security, commercialization and environmental conservation. Specifically the government recognized the rapid decline in the natural environment and stagnation in agricultural productivity in western Kenya and initiated a number of jointly funded projects to improve productivity and reverse environmental degradation.

The project design has been changed over the period of five years it has been operational. Initially the project proposal considered covering all lands in Western Kenya that fall within the Lake Victoria watershed. However this later changed to focus on three river basins (Nyando, Yala and Nzoia). It was seen that since the project was to have an important demonstration effect the 3 river basins were considered appropriate. However the MTR, recommended that the coverage was still too ambitious given the available resources. Thus finally although the three basins were retained WKIEMP activities were confined to selected Micro-catchments in Upper, Middle and lower Nyando; Lower Yala and Land Management Units in lower Nzioa. The Micro-catchments approach was considered more manageable. The Integrated Ecosystem Management was unique to WKIEMP and had potential of being more effective in addressing problems of natural resource degradation and achieving sustainable farming system. Capacity building of communities in IEM, participatory assessment, planning, decision making, implementation and evaluation had an effect on empowering the farmers to determine what to do. Scaling-up of proven IEM interventions to address farmer identified constraints was a prudent way of resource utilization and for quick outputs. However sequential implementation of IEM intervention starting with Nyando basin, then Yala and finally Nzoia and only in the lower zones of the last two, ended up disadvantaging the latter two due to time constraint.

Project Implementation was affected by a number of factors that were not envisaged at the appraisal stage. The geographical coverage was too ambitious as stated earlier. The eventual scaling down to micro-catchments enabled the project to more effectively pursue project objectives. The flow of funds had challenges due to factors such as the system of accessing and accounting (SOE) that was adopted as per the Grant Agreement. Although the agreement allowed for use of both FMR and SOE with subsequent switch to FMR, the project never used the FMR to access funds even though FMRs were submitted first in June 2008 to cover the period My 2008-June 2008 and subsequently every quarter thereafter. The long route/procedure of processing re-imbursements and the internal delays in accounting collectively contributed to delays in disbursements. These delays resulted in delayed implementation of Small Grants programme which was not operationalized, except in lower Nyando basin, till June 2010, when funds for Yala and Nzoia were released. Even for lower Nyando, only sum of ksh. 970,000 for seven CBOs had

been disbursed by the third year of the project. The bulk of successful grant applications for lower Nyando have remained outstanding up to the completion of the project.

The need for long periods of community mobilization and sensitization was not envisaged at appraisal. However the reality on the ground showed the need for long contact time with the communities for them to grasp the IEM concept which contributed to over staying in the areas where the project started operating in.

Implementation of activities related to carbon sequestration and measurements of carbon stocks was to be done by ICRAF through contractual agreements with a view to build capacity of KARI scientists in these aspects. However by the end of the project this had not been achieved. This was attributed to high turnover of scientists from ICRAF who would have spearheaded the work. However one KARI staff is currently pursuing an MSc at Moi University and the project in collaboration with an NGO, VI Agroforestry had been initiated to build capacity for project staff. Even with this arrangement the NGO did not carry out formal training for KARI project staff.

The implementation arrangements of the project had adequate structures from national level to Micro-catchments. Technical Advisory Group (TAG) provided supervision at National level while the micro-catchments committees oversaw preparation of proposals and implementation of group activities. Initially there was a plan to use a structure for scaling-up options (Consortium for Scaling-up Options for Increased Farm Productivity – COSOFAP), to scale up technologies from group activities, however the project started when this structure was winding up its activities and thus did not benefit much from it.

2. Achievement of Project Development Objective

PDO Outcome No. 1: Decreased number of food-deficit months per annum. *This outcome is likely to be achieved* in the very near future. There are a number of interventions that the project has instituted towards achievement of this outcome, that show a lot of potential. The use of improved agricultural practices such as hybrid maize, certified seed, fertilizer and diversification into horticulture and livestock has increased productivity of the farms tremendously. Instances of ten to twenty-fold increases in maize yield on small acreages were cited by farmers participating in the project. A group within Nzoia Basin – 'Sifuyo Kweg Lamo women group' had its members increase maize production from 8kg to between 270 and 360kg per farm. Use of TC bananas has also potential of increasing income and contributing to food security. 'Jakech Ratego women's group' also in Nzoia Basin has already sold 18 bunches at KES 300/= each and suckers at KES 200/=. Another group in Yala basin – 'Aluor widows support group' are upgrading their indigenous goats using Toggenburg buck and over 100 does have been served. This has also been taken up by other groups such as 'Rera Small-scale farmers youth group'. The off-springs are expected to improve household milk availability among members.

Due to the above interventions there is slight decrease in the food-deficit months for households under IEM. From 2004 to 2009, maize shortage months decreased from 5.3 to 4.5 and meat from 5.7 to 5.5. The households not under IEM reported an increase in the number of food deficit months, over the same period. This trend is expected to continue as the introduced technologies are widely adopted and farmers improve their capacity in implementation.

PDO Outcome No. 2: Percentage of households in the project intervention areas that are satisfied with project intervention. *This outcome was achieved.* In all the three river basins the groups in the micro-catchments have very high regard for the project and what it has enabled them

to achieve. The bottom-up approach the project adopted in identifying projects for the communities/groups ensured that the projects were not imposed on the farmers. The establishment of Micro-catchment committees contributed to a sense of ownership and enhanced chances of future sustainability. Some of the technologies that were introduced especially the tree nurseries have been commercialized giving a lot of incentives to the communities. Finally farmers are very satisfied with the project's initiative in capacity building of communities in the areas of crop and livestock production, ecosystem management leading to very good understanding of the environmental objective of the project, leadership and group dynamics, skills in writing proposals to seek for funding and capacity to engage service providers. In the 11 micro-catchments that were studied about 50% of the respondents were motivated to undertake IEM options by WKIEMP, and 60% were relying on the project as a source of IEM information. This initiated adoption of IEM technologies as indicated by a subsequent adoption studies undertaken later.

The impact assessment study provided the adoption rates as shown in Table 1 of the various IEM interventions promoted by WKIEMP. For the interventions where there was baseline data from the 2004 survey, it was apparent that the WKIEMP households had higher adoption rates than the control households (i.e. those who did not participate in WKIEMP).

Table 1: Adoption rates of IEM technologies by beneficiary and the control households

Impact Area (A)	% beneficiary adopting in 2004 (B)	% beneficiary households planting/ adopting 2005-09 (C)	% control adopting in 2004 (D)	% control households planting/ adopting 2005-09 (E)	Adoption effect (C-B) – (E-D)
Timber trees	69.7	92.6	86.6	76.8	32.7
Fruit trees	54.1	77	67.9	70.5	20.3
Fodder trees	13.9	53.3	8	21.4	26
Maize / bean through:					
Soil fertility trees	13.9	54.1	12.5	25.9	26.8
Soil conservation	NA	41.3	NA	30.5	NA
Other soil fertility investment	NA	34.7	NA	23.2	NA
Banana	NA	13.9	NA	23.2	NA
Vegetables (Kales)	NA	12.3	NA	17	NA
Bee keeping	NA	4.9	NA	0.9	NA

The adoption rates are expected to increase with time, given the willingness of farmers to continue implementing the IEM options beyond the life of WKIEMP. In a survey conducted in 2008 overall percentage of households that were willing to continue implementing IEM activities was 78.2% (Table 2). It was highest in Katuk Kapsit (96%), Samathe Luore (91%) and Sifuyo Masat (91%) and lowest in Dhene (50%) and Uwasi B (50%).

Table 2: Households willingness to continue practising IEM after the Project closure

Micro-Catchment	Yes		No		Don't know/N/A
	No.	%	No.	%	%
Dhene	15	50	4	13.3	36.7
Gogwa	16	72.7	1	4.5	22.8
Kapsokale North	26	72.2	2	5.6	22.2
Kapsokale South	28	87.5	1	3.1	9.4
Katuk Kapsiti	26	96	1	4	0
Namuduru	33	75	2	4.5	20.5
Nyanya	32	82.1	3	7.7	0.2
Onyuongo	24	75	0	0	25
Samadhi Luore	20	91	0	0	9
Sidundu	14	87.5	0	0	12.5
Sifuyo Masat	40	91	0	0	9
Uranga	23	68		3	23
Usonga wetland	3	75		2	0
Uwasi B	2	50		0	50
Total	**302**	**78.2**		**18**	**17.1**
n=320					

The impression based on interviews in the field at the time of compilation of this report (June 2010), was that these figures are likely to be higher. The willingness to continue with the project activities even beyond the funding period is an indication of the level of satisfaction with the project interventions.

3. Achievement of Global Environmental Objective

Improved regional and on-farm and off-farm biodiversity, carbon sequestration, and rehabilitation of the degraded lands and catchments was the global environmental objective for this project.

GEO Outcome Indicator 1: Area forested for carbon sequestration. Encouraging farmers to plant trees was a major project activity that aimed at (a) rehabilitating degraded soils and (b) protecting river banks in the three river basins. To reach the targeted beneficiaries, the micro-catchment approach was adopted. Community awareness on importance of trees was done through micro-catchment committee / group meetings. In addition, there was training on tree nursery establishment and management organized by WKIEMP and other collaborators like Kenya Forestry Services.

After five years of project implementation, project beneficiaries (farmers) are now able to articulate environmental benefits of tree planting including mitigating against global warming

(climate change); soil erosion control and improved biodiversity. Even though most of the groups did not fully understand the Environmental objectives the enthusiasm exhibited in tree planting shall contribute significantly towards contribution to Carbon sequestration. However there is need to link up the farmers to the Carbon market. They are also able to link the importance of joint upstream and downstream environmental conservation measures along the river basins. A total of 117 community managed tree nurseries have been established and about 2.6 million seedlings distributed for planting to farmers. The actual area reforested as at June 2010 was 1,820 ha (equivalent to 2.6 million trees planted with an estimated survival rate of 70%) against a target of 1,400 ha. This figure includes the area covered by the 48 established model farms with average 0.5 ha each. It does not include area covered by the soil and water conservation strategies such as water pans. *Therefore, this indicator was achieved.*

Several opportunities are available that are likely to further enhance the number of trees planted in future. They include:

- Government directive that 10% of all farm holdings be under trees could increase demand for seedlings. It is anticipated that the Kenya Forestry Services could buy seedlings from the group or community tree nurseries and distribute them to farmers.
- Increased awareness among households in the 15 operational micro-catchments on the importance of planting trees and also on removal of cultural barriers (taboos) that women cannot plant trees.
- Integrated approach involving agro-forestry and honey production promises as an alternative livelihood strategy for farmers along the three river basins.
- Realization that trees are an alternative source of farm income through sale of timber (cyperus; eucalyptus etc) in the medium- and long- term.

However, full realization of the environmental objective could occur in the long term. Thus sustainability of the tree planting activity may require that the existing Basin Technical Committees and the Micro-catchment committees be maintained; linkages between the nurseries and Kenya Forestry Service (for supply of seedlings) be strengthened and survival rates of planted seedlings improved through control of termites (Nzoia and Yala basins) and control of free range grazing systems especially after crop harvest (Nyando basin).

GEO Outcome Indicator 2: Decreased incidence of soil erosion in project intervention areas. In an effort to reduce the incidence of land degradation in the three basins of rivers Nyando, Nzoia and Yala, the project instituted several intervention measures that included: conserving degraded area through construction of soil conservation structures (cut-off-drains, check dams, water pans); re-afforestation of degraded lands; multiple cropping and appropriate crop agronomic practices. In addition, 48 model farms demonstrating integrated ecosystem management practices (woodlot establishment, improved agronomic practices, and soil and water conservation structures) were laid side by side on community group owned farms to act as learning centres for other communities with possible wider adoption by farmers.

Though the implementation of the interventions was faced with several constraints such as lack of knowledge on land tenure systems leading to fear that the government was about to take their land if water pans were constructed, and insufficient farmer understanding of the importance of soil conservation, the project has had several positive impacts. They include:

- Awareness on the role of communities to manage common resources (e.g. streams and rivulets, water pans) through WKIEMP community sensitization and trainings was enhanced. With support from the project, the community managed co construct several waterpans such as Kobam (9,000m^2) and Simbi (26,000 m^2) in the Nyando basin. These have contributed to reduced soil erosion in their vicinity besides provision of water for livestock and irrigation.
- Basin Technical and micro-catchment committees with established by-laws on the development and management of the common resources have been established. These committees have by-laws that discourage free range grazing initially rampant in these areas, and a big contributor to environmental degradation.
- Regeneration of vegetation on degraded sites and the establishment of planted trees have been successful in Kalacha (15 acres), Kokoto (3 acres) and Kowala rehabilitation sites.
- Some farmers have adopted introduced fodder crops (Napier) and fodder shrubs (calliandra, sesbania etc) for livestock feeds by planting them particularly on terraces thus contributing to minimization of soil erosion and overgrazing.

However, concentrating soil conservation interventions efforts at downstream blocks before the upstream blocks has partially resulted in minimal success in the healing of Koyombe and Katuk Odenyo gullies. In addition, natural regeneration of land has been hampered by the not-fully controlled communal free range grazing system and lack of incentives for soil conservation given the prevailing land tenure system (younger farmers not having full control of land which is under the control of their elderly parents). However, it has been observed that Onyuongo gully is gradually healing due to reduced soil erosion upstream.

The baseline value for decreased incidence of soil erosion in project intervention areas (watersheds that feed into the Nyando, Yala and Nzoia river basins) was based on the number of clusters observed to be erosion prone in 2006. Subsequent estimations based on the observed and counted incidences (both by community and PCO staff) of erosion within micro catchment clusters after the construction of soil and water conservation structures through the project activities was given as 45% as at June 2010 similar to what was targeted. *In this regard the indicator was achieved.*

4. Efficiency

The economic analysis. Household economic analyses were conducted by a team of KARI and ICRAF scientists in October 2010 using a 20 year horizon with costs and benefits discounted by 12%. Costs and output prices were obtained through data collected during focus group discussions, key informant interviews, and secondary sources. Net benefits and discounted net benefits were then calculated for each of the impact areas from which net present values (NPV), benefit cost ratios, and internal rates of return (IRR) were derived. Furthermore, several scenario analyses were undertaken.

The first was the long term benefits of current levels of observed differences in impact (for banana, kale, honey) or in adoption (timber, fruit and fodder trees which have yet to produce benefits). The second assumed an increase in the level of adoption for those households who already have adopted (e.g. those who already adopted an improved bee hive is assumed to have increased their investment). This was done for the case of all enterprises, where it was assumed that honey production was quadrupled (from a very low initial point), kale, banana and fodder trees were doubled, and timber and fruit trees increased by 25% (this is lower because WKIEMP farmers had

already planted many of these trees). A third scenario used all the assumptions of the first and doubled the adoption rate among WKIEMP households for kales, banana and honey. For trees, scenarios 2 and 3 are identical because already a very high percentage of WKIEMP households were planting trees. These more optimistic scenarios are justified from experiences with farmer adoption behavior which indicate a strategy of incremental adoption for these types of investments in Kenya. It is also justified by the fact that WKIEMP households stated that the project had greatly increased their knowledge in IEM practices, as compared to the control group.

Table 3 below shows the net economic benefits accruing to all WKIEMP households in the five blocks lower blocks where the surveys were conducted. The result shows the following overall economic indicators for the project under the base scenario 1:

Project level NPV (12% discount rate): $2.1 million
Project level benefit cost ratio (@at 12% discount rate): 1.58
Project level internal rate of return: 17.9%

Table 3: Summary of Economic Indicators for Project

Impact Area	Impact for all beneficiary households in 5 blocks (1) (+500 hhs)	Impact for all beneficiary households in 5 blocks (2) (+500 hhs)	Impact for all WKIEMP households in 5 blocks (3) (+500 hhs)
Total Net Present Value ($)	5,981,855.758	9,383,079.985	13,303,606.38
Project Costs ($)	3,790,508	3,790,508	3,790,508
Project NPV ($)	2,191,347.758	5,592,571.985	9,513,098.379
Project Benefit Cost Ratio	1.58	2.48	3.51
Project IRR	0.179		

Positive externalities. It was observed that the project empowered the communities and local partners to prioritize their activities. The practical/hands on implementation of the project activities by the project staff on the ground was highly commended by the collaborating partners, especially the officials of the line Ministries, for it empowered the beneficiaries to participate in decision making and project implementation. This is was contrasted with past practices where project beneficiaries were only taught in seminars and workshops without the practical application or follow up on application of what was taught.

The project helped established several community development structures as the micro-catchment committees which have enhanced the capacity and empowered the local communities to seek support and solutions for their development problems. Some of the communities due the enhanced capacities have been able to develop competitive grant proposals submitted to the CDF, NGOs and other development agencies and received support.

The management and control of the spread gullies was minimized the amount of soil which found its way to Lake Victoria and hence reduced siltation.

5. Justification of Overall Rating

The PAD listed eight Performance Indicators that were revised at Medium term Review to four Outcome Indicators, two for the PDO and two for the GEO. As stated above, one PDO outcome (Outcome No. 2) was achieved while the other, Outcome No 1 is likely to be achieved in the very near future based on the inventions the project instituted. Both GEO Outcome Indicators were achieved.

This Satisfactory rating reflects: (i) relevance of the project's design and investments made; (ii) the positive impacts on the local communities in the three river basins that were derived through the introduction and adoption of a relatively complex concept of integrated ecosystem management, (iii) the adoption of improved technologies that led to achievement of the PDO and GEO outcome indicators, and very importantly (iii) the very enhanced capacity of the communities and effective structures put in place to provide continuity in the furthering the achievements.

6. Overarching Themes, other Outcomes and Impacts

The project empowered poor rural household groups in the three river basins through several interventions:

- By spending over KES 13 million to buy 2.6 million seedlings @ KES 5 per seedling from the 117 community based nurseries the later got seed money which they used to strengthen their respective groups by meeting financial obligations like paying for registration certificates, accessing inputs to further strengthen commercial activities for respective groups, etc.
- Through the many community training seminars, farmers were empowered to write grant winning proposals to undertake demand-driven livelihood enhancing activities for their groups. In total, WKIEMP disbursed KES 979,550 to 7 groups in 2007 and KES 10 million to another 98 groups in 2010. Having also been sensitized on possible areas they could access funds from such as local and International NGOs, Constituency Development Fund, Local Authority Trust Fund, Women Trust Fund, Fund for the Disabled and the Youth Fund, for their planned activities some groups have obtained funds from some of these sources. For instance, Nyadorera Adult Learning Centre of Lower Nzoia Block obtained KES 200,000 (from Ministry of Health) and 120,000 (from "Njaa Marufuku", Kenya) for AIDs orphans, and Jimo Onyuongo Soil Environment and Conservation Group (Lower Nyando Block) obtained KES 100,000 from Constituency Development Fund for construction of a community dam.
- *Gender cultural empowerment*: Through sensitization and training meetings, women have now been culturally empowered to plant trees, bananas and even construct terraces. Given that majority of farmers comprise women, more trees and bananas are likely to be planted, and efforts towards soil conservation will be enhanced, *other factors held constant*.

Given the many community participatory seminars and demonstrations for agronomic skills development held by WKIEMP, households have been exposed to low cost technologies such as row planting, composting, biomass transfer, intercropping, planting of calliandra etc which if adopted are likely to improve their household food and feed security, improve their nutrition and enhance household incomes.

7. Summary of findings of beneficiary survey and impact assessment

Social impacts: ***Food security and welfare indicators.*** During the impact assessment study, questions were asked of all respondents on the number of food deficit months, on overall food production, purchasing and consumption, and on the extent of ownership of various assets as of 2004 and then again in 2009. From these responses, changes over time were calculated for the WKIEMP group members and the control group as shown in Table 4.

On average WKIEMP households decreased the number of maize and meat deficit months. In the case of maize, the decrease was large, at almost 1 month. On the other hand, the control households experienced an increase in maize deficit periods, by almost half a month and had almost no change in meat deficit months. This is further supported by the other food security indicators. Nearly 60 % of WKIEMP households indicated an increase in the production and consumption of food over the period. This compares favorably with the control group for which only 31 to 37 percent claim to have experienced such positive outcomes.

Table 4: Comparisons of food security and welfare indicators between beneficiary and control households, 2004-2009

Food Security and Welfare Indicator	**Beneficiary Group**			**Control Group**		
	2004	2009	Difference	2004	2009	Difference
Maize deficit months	5.27	4.33	-0.94	4.91	5.35	0.44
Meat deficit months	5.71	5.41	-0.3	4.57	4.56	-0.01
% producing more food 04-09			0.59			0.37
% buying more food 04-09			0.37			0.6
% eating more food 04-09			0.59			0.31
Mobile phone - % owning	0.37	0.72	0.35	0.41	0.62	0.21
Improved stove - % owning	0.32	0.41	0.09	0.25	0.28	0.03
Radio - % owning	0.78	0.78	0	0.74	0.77	0.03

A number of assets were also enumerated. Some, such as motorbikes and bikes did not change over the period for any of the groups. However, some changes were detected in mobile phones, improved stoves, and radios. Mobile phone ownership grew for all household types, but more rapidly among WKIEMP households than for the control group. The same is true for improved stoves.

Farmer capacity building impacts. During the same survey, households were asked to evaluate the change in their knowledge of tree planting, soil management, crop management, and livestock management during the 2004-09 periods. Without exception, WKIEMP group households were much more likely to have responded that their knowledge increased significantly than other types of households. Conversely, the control households were much more likely to respond that their knowledge had decreased or remained unchanged. As an example, 87% of WKIEMP group households stated that their knowledge of tree planting had increased while only 55% of control households responded similarly. Households were also asked about their gain in knowledge on

marketing of outputs and accessing information. Again, WKIEMP group members were much more likely to have gained knowledge. As many as 97% of these households felt that their knowledge on how to access information had improved, as compared to only 54% of control households. In all cases, the knowledge gain of informal WKIEMP households was in between the case of WKIEMP group households and control households. Thus, many of these types of households also benefited from the WKIEMP project.

8. Assessment of Risk to Development Outcome

The overall risk to development objective is assessed as moderate. At appraisal five of the critical risks identified for the project had direct implication to development outcome; (i) Beneficiaries might have redirected funds available to other purposes (ii) Community members might not have been able to work together to manage resources (iii) Non-adoption of technologies intended to promote IEM (iv) Community groups might have lacked the necessary capacity and (v) Risks associated with theft and fraud.

The risk of redirecting funds to other purposes was reduced to ***low*** due to intensive community mobilization, training and in developing PAPs. This together with close supervision by the project field staff assisted by the social and extension staff ensured that funds were spent on the intended IEM projects.

The training on group dynamics, leadership and conflict resolution provided to the community groups working with the project, led to the groups working together very well to manage the resources. However the ICR team got the impression that one of the factors that made the groups work well together was the support they were getting from the project (especially farm inputs and cash received for the seedlings raised). Where the groups have commercialized tree nurseries, this is likely to continue, however the groups that have not found a market for their products, continued working together shall be a challenge. Thus the risk for groups continuing working together is rated as ***moderate.*** Such groups should be assisted and linked to markets, and in this respect role of project partners such as extension agents is important after the end of the project.

The IEM technologies that were used were already tested and proven to work, more importantly the development of PAPs after assessment of framers requirement entailed that the technologies provided for adoption were those demanded for. Thus the risk of non-adoption of technologies was evaluated as ***low***. Most of the group members had adopted the technologies (tree planting, soil conservation, certified crop seed, crop husbandry, fertilizer use, horticulture) in their individual farms. However within the micro-catchments the off-farm conservation efforts were challenged by the land tenure system, where individual owners (who were not group members) would not allow any rehabilitation work to be carried out on their land.

Capacity building for community groups was undertaken in various areas of IEM. Specifically the groups were trained in tree nursery management, soil and water conservation methods, local poultry and goat production, bee keeping, sericulture, in targeted micro-catchments in the three river basins of Nyando, Yala and Nzoia. The groups were also taken through group dynamics, resource sharing, and conflict resolution. All these built capacity of community groups participating in the project, thus reducing the risk of lack of capacity to ***low***.

The establishment of management committees within the groups at Common Interest Group level and Micro-catchments level, controlled the resource use and minimized risk to theft and fraud. This was further strengthened by the registration of groups with the Department of Social Services

and subsequent supervision of group management by the District Social Services Officers. However the regulations for operating bank accounts for the grants received were not stringent enough to prevent theft and fraud. Banks were to be notified of the authorized signatories to the account through minutes of group meetings signed by all members. The Social Services Officer did not have to corroborate that the group actually held the meeting. This opened a loophole that fraudsters within groups could use to defraud. The risk to theft and fraud is therefore rated as ***Significant.*** A group in lower Nzioa lost its last Grant through this means, about three days after receiving and banking the grant money. Such unfortunate occurrence could be prevented if the Department of Social Services endorsed the change of group officials before they are presented to the bank.

Further assessment of risk to development outcome can generally be based on technical, institutional, economic/financial, environmental and social criteria. The risk is ***low*** in some of the criteria such as (i) the use of tested and proven technologies for IEM in the project entailed appropriateness to the farming community (ii) the government's policy change and emphasis on turning around subsistence small-scale farmers into commercial farmers in its development blue-print Vision 2030, and establishment of support mechanisms will provide required institutional arrangement for sustainability.

However ***moderate*** risk could be experienced in (i) access to financial resources by the farming communities. There are a number of sources of funds for farmers (CDF, economic stimulus package, youth and women enterprise funds, Kilimo Biashara, etc.) that could be accessed and with the capacity built by the project on grant proposal writing, these funds could be accessed. However, most groups were still not aware that they could submit proposals for funding from these sources. Thus awareness creation is needed; (ii) on farm inputs where the government has an elaborate program to reduce costs especially for seed and fertilizer. Under vision 2030, there is a three-phase program to reduce the price of fertilizer (short-term improved coordination of bulk purchases, medium-term provision of incentives for local blending, and long-term support to establishment of local manufacturing capacity). However availability of subsidized fertilizer still has challenges and this also applies to livestock breeding stock, animal feeds and marketing of livestock products.

The environmental risk to development outcome is ***significant***. The project succeeded in formation of active groups and management committees, in building capacity for community driven integrated ecosystem management (IEM), and effective demonstration of tested technologies (tree planting, soil and water conservation, crop and livestock production). However, linking of interrelationships of lower, middle and upper zones along the river basins was still not appreciated by most of the groups. Only a few micro-catchments committee officials had grasped the concept. This together with the decision to concentrate on only the lower zones of Yala and Nzioa, presents significant risk to development outcome. The lower zones are the flood plains and control of flooding depends on what happens up- and mid-stream. Thus it does not matter how much development is realized at the lower zone of rivers that are characterized by almost annual flooding.

The off-farm environmental conservation was also affected due to inaccessibility to degraded areas in a free-hold land tenure system. The sodic soil types in lower Nyando, presents unique problems of gully erosion that requires concerted efforts to control amount of water coming from higher grounds. The few control dams constructed by the project demonstrated their effectiveness but much more investment than could be provided by the project is required to tame the gullies.

The social risk to development outcome is ***low***. The project involved all gender, youth and disabled groups to participate in the development activities. The participatory approach in development of action plans enabled everybody to contribute to decision-making process. This ensured that the adopted technologies did not impact negatively on local populations. Most significant impact of the project was breaking of age-old barriers in some communities about participation of women in planting trees and bananas.

9. Assessment of Sustainability and Risk to Global Environmental Objective

9.1 Sustainability

Box 1: Anticipated measures of sustainability

At project appraisal stage, sustainability was to be achieved through: i) focusing on capacity building of local technical resource services, and producers; ii) recognizing and capitalizing on the crucial role of local governments and local producer and community organizations to organize, promote, monitor and assess implementation; and (iii) utilizing existing institutional structures to implement project activities and deliver outputs. Additionally, the project was to fund community-based sub-projects, including some community infrastructure, the required funds for which would be determined based on the community's demonstrated ability to maintain the assets over the long-term. With a view to further ensure sustainability of the activities beyond the project period, the project was to build upon existing initiatives in government and non-governmental institutions, thus reducing the risks associated with the establishment of new initiatives.

It was anticipated that if improved ecosystem management in the target communities could be sustained then the project farmer beneficiaries could be economically and environmentally be self-sustaining over time. Furthermore, the project could place funds in the hands of communities and facilitate the provision of technical assistance through the public or private sector by making application and screening procedures for community proposals as simple as possible, and by providing ample funds for capacity building at all levels. It was also expected that experiences gained in farmer-led initiatives on conservation and sustainable use of natural resources could be replicated within Kenya and potentially other countries with similar agro-ecological situations.

Several stakeholders including extension agents (Ministries of Agriculture and Livestock Development), local provincial administration officers, National Environmental Management Authority (NEMA), Kenya Forestry Services, etc. in addition to KARI were involved in implementing WKIEMP activities. As these local institutional structures were able to deliver on the project environmental outputs, it is anticipated that with the completion of the project, some aspects of the project initiatives especially with regard to protection of community resources such as dams and water-pans through assistance of the provincial administration will continue. In addition, at the end of the project, 105 community-based sub-projects had received funding for integrated IEM activities including construction of community dams. It is anticipated that benefits arising from implementation of these activities if properly managed will contribute to make the community IEM activities economically and environmentally self-sustaining over time. Strict enforcement or observance of by-laws governing micro catchment land degradation and riverbank protection will enhance environmental sustainability.

Given these scenarios, assessment of sustainability of the environmental objective is therefore rated ***moderate***.

9.2 Risk

From outputs to environmental objective, it was anticipated that

- *beneficiaries may redirect the funds available to other purposes*
- *community members are able to work together to manage resources*
- *non-adoption of technologies intended to promote IEM*

From components to outputs, it was anticipated that

- *difficulty in identifying changes which will have the desired effect*
- *groups may lack the necessary capacity*
- *risks associated with theft and fraud*

Mis-use of project funds was rare and many environmental conservation activities were undertaken successfully. This could be attributed to project beneficiary sensitization meetings which led to attitude / cultural changes among local politicians, farmers and provincial administrators. Community members worked together in managing common resources through established micro catchment committees which were backstopped by respective basin technical committees. However, there is still a need to train micro catchment committee members on common resource governance, record keeping, financial resource mobilization and management to minimize the risk of some farmers falling off midstream thus reversing any gains so far achieved on environmental conservation. In this regard, the risk to non-attainment of this environmental objective was ***low.***

In several instances, there were difficulties in identifying changes that had occurred with project implementation. For instance, due to high project staff turnover at ICRAF[4], measurements of regional and on- and off-farm biodiversity[5], and carbon sequestration could not be undertaken. However, through a memorandum of understanding between the PCO and Vi Agroforestry, a methodology for carbon and other GHG emission measurements has been developed and baseline available. In addition, an inventory of the available skills within organizations in western Kenya on carbon stock measurements has been documented. Additionally KARI has enrolled a student to do a masters training in assessments of GHG gases. In this regard, the risk to not attaining this environmental objective was ***moderate***.

II. Borrower's Comments on Draft ICR

The draft has been reviewed by KARI. Generally KARI agrees with the overall assessment of achievement of the indicators. The ratings are also largely in agreement with those from the internal review by KARI. However there are a few areas where the wording of statements may need to reflect the position as at the project closure.

1. ***Key Factors Affecting Implementation and Outcomes.*** KARI suggests that factors which affected the project positively and negatively be separated for clarity.

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[4] Through contractual agreements with KARI, ICRAF was supposed to measure changes in carbon and other GHG emissions.

[5] Through contractual agreements with KARI, Moi University conducted four rapid biodiversity baseline inventory surveys to generate environmental baseline data for the lower blocks of the three river basins.

2. ***Achievement of Project Development Objective.*** This section is silent on the PDO outcome indicator No.2 "percentage of the households in the project intervention areas that are satisfied with project interventions". This outcome was achieved.

3. **S**ustainability of the land use system was not fully attained mainly due to (i) ……. (ii) Insufficient understanding by communities with regard to up-stream-downstream linkages to enable longer-term environmental improvements. (note that it is the communities who did not have sufficient understanding and not the project staff).

4. ***Achievement of Global Environmental Objective.*** There were again two outcome indicators under this objective (i) area forested for Carbon sequestration and (ii) decreased incidence of soil erosion. It is the opinion of KARI that assessment is given based on these two indicators. As indicated in the Bank's ICR the GEO was achieved based on these two outcome indicators, with an over-achievement of forested areas (1,820 ha against a target of 1,200 ha).

5. ***Justification for Overall Rating.*** The PAD listed eight Performance Indicators that were revised at MTR to four Outcome Indicators, two for the PDO and two for the GEO. As stated above, one PDO outcome (Outcome No. 2) was achieved while the other, Outcome No 1 is likely to be achieved in the very near future based on the interventions the project instituted. Both GEO Outcome Indicators were achieved. Thus the overall rating could be improved to 'Satisfactory'.

6. The Satisfactory rating reflects: (i) relevance of the project's design and investments made; (ii) the positive impacts on the local communities in the three river basins that were derived through the introduction and adoption of a relatively complex concept of integrated ecosystem management, (iii) the adoption improved technologies that led to achievement of the PDO and GEO outcome indicators, and very importantly (iii) the very enhanced capacity of the communities and effective structures put in place to provide continuity in the furthering the achievements

7. ***Achievement of Objectives based on Results Framework.*** PDO Outcome indicator reading "decreased number of food-deficit months per annum". The baseline, Target and Actual Values given in 'percentage' do not reflect what the indicator requires thus it could be dropped and retain the remarks.

Annex 8. List of Supporting Documents

World Bank Project Documents

Project Appraisal Document, Report No: 31413-KE, January 2005
Global Environment Facility Trust Fund Grant Agreement (TF054250-KE) between Republic of Kenya and International Bank for Reconstruction and Development acting as an Implementing Agency of the Global Environment Facility, May 2005
Project Agreement (TF054250-KE) between International Bank for Reconstruction and Development acting as an Implementing Agency of the Global Environment Facility and Kenya Agricultural Research Institute, May 2005
Seventh Quality at Entry Assessment (QEA7) Fiscal Year 2004-2005, July 2005
Aide Memoires and Implementation Status Reports (throughout the Project)
Restructuring Paper on a Proposed Project Restructuring of Western Kenya Integrated Ecosystem Management Project, March 2010
Final Report on Supplementary Field Data Collection for the ICR Development, November 2010.

Other World Bank Reports

Country Partnership Strategy for the Republic of Kenya for the Period FY2010-13, the International Development Association, the International Finance Corporation, the Multilateral Investment Guarantee Agency, March 2010

GoK/KARI Reports and Documents

Environmental and Social Management Framework (ESMF), E974 V.2, October 2004
Project Progress Reports (throughout the Project)
Participatory Action Plans (PAP) for micro-catchment committees
Environmental Impact Assessment Report on Proposed Construction of Simbi Water Pan – Nyando Basin, February 2008
Mid-term Review Report of the Western Kenya Integrated Ecosystem Management Project (WKIEMP), May 2008
Financial Management and Procurement Report, May 2008
Participatory Community Planning for Integrated Ecosystem Management (experiences from three river basins), 2008
Environmental Impact Assessment report on Proposed Construction of Kaplelach Water Pan – Soin Division, Kericho District Nyando Basin, February 2009
Environmental Audits: Koyombe and Kobam Water Pans, September 2009
Towards Sustainable Wetland Management: A Case Study of Disi Wetland in Lower Nzoia River Basin, February 2010
Challenges to Institutional Collaboration and Structures to IEM Implementation: An Experience from the Western Kenya Integrated Ecosystem Management Project, May 2010
Development and Implementation of a Monitoring & Evaluation system: Experiences and Lessons from the KARI-WKIEMP, May 2010
Environmental M&E End of Project Report May 2010

Toward the Establishment of Institutional Mechanisms for Community Management of Carbon Asset, May 2010

Project Impacts and Sustainability Prospects (one overview and detailed report as per three river basins, May 2010

A Field Guide Manual of Promoted Technologies May 2010

Report on Disbursement to Communities, June 2010

Status Report of Community Funding 2006 to 2010, August 2010

Impact Assessment of WKIEMP: Focus Group Discussions, Household Survey Analyses, and Land Use Change Detection in the Lower Nzoia, Lower Yala, and Lower Nyando River Basins, October 2010

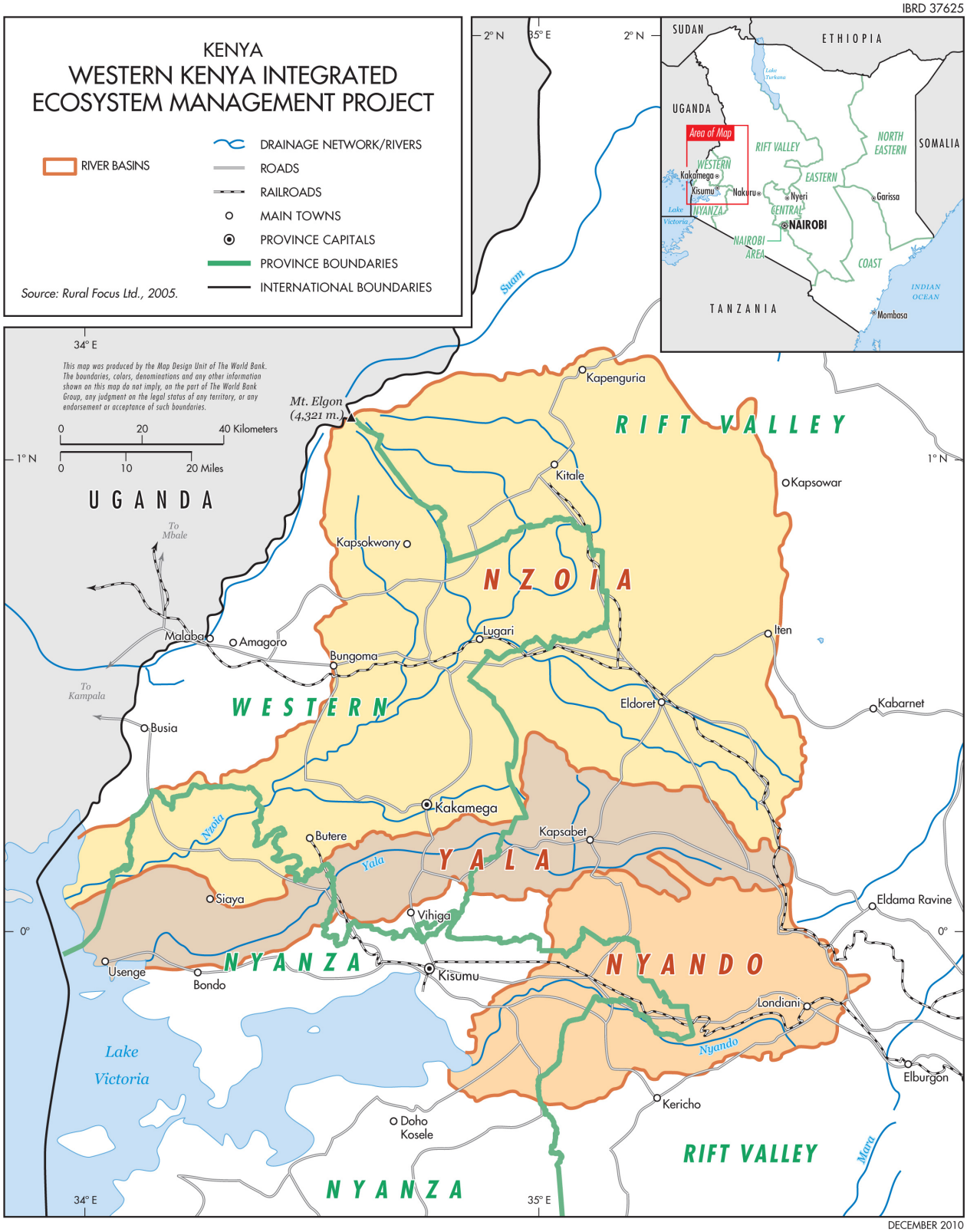
Implementation Completion and Results Report by Government of Kenya, November 2010

Other Relevant Reports

Kenya Vision 2030: A Globally Competitive and Prosperous Kenya, October 2007

Participatory Rural Appraisal Report for Disi Wetland, Siaya District, VIRED International, 2009

IBRD 37625



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