

Analysis of Financial Mechanisms for Green Water Credits in the Upper Tana, Kenya



World Soil Information

Green Water Credits Report 17



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Green Water Credits Report 17

Wageningen, 2011



Ministry of Agriculture



Water Resources Management
Authority



Ministry of Water and Irrigation



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Citation

F.N. Muchena, D.D. Onduru and J.H. Kauffman, 2011. *Analysis of Financial Mechanisms for Green Water Credits in the Upper Tana, Kenya*. Green Water Credits Report 17, ISRIC- World Soil Information, Wageningen.

The assignment was carried out by: Fred Muchena and Davies Onduru
The contributions by farmers, ISRIC and all Organisations included in this report are highly appreciated

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Green Water Credit Institutional Survey in Upper Tana Catchment was commissioned by ISRIC-World Soil Information and conducted by ETC East Africa Ltd



Green Water Credits Report 17

Foreword

ISRIC – World Soil Information has the mandate to create and increase the awareness and understanding of the role of soils in major global issues. As an international institution, ISRIC informs a wide audience about the multiple roles of soils in our daily lives; this requires scientific analysis of sound soil information.

The source of all fresh water is rainfall received and delivered by the soil. Soil properties and soil management, in combination with vegetation type, determine how rain will be divided into surface runoff, infiltration, storage in the soil and deep percolation to the groundwater. Improper soil management can result in high losses of rainwater by surface runoff or evaporation and may in turn lead to water scarcity, land degradation, and food insecurity. Nonetheless, markets pay farmers for their crops and livestock but not for their water management. The latter would entail the development of a reward for providing a good and a service. The Green Water Credits (GWC) programme, coordinated by ISRIC – World Soil information and supported by the International Fund for Agricultural Development (IFAD) and the Swiss Agency for Development and Cooperation (SDC), addresses this opportunity by bridging the incentive gap.

Much work has been carried out in the Upper Tana catchment, Kenya, where target areas for GWC intervention have been assessed using a range of biophysical databases, analysed using crop growth and hydrological modelling.

The objective of the study reported here was to design and document a financial mechanism for the proposed Green Water Credits Investment Fund. Thus it studied farmers' preferences for investment mechanisms in soil and water conservation (SWC) or "*green water* management", secondly it identified and described models, mechanisms and arrangements for SWC, and finally the authors identified potential sources of funding. The conclusions of the study are distilled into ten key points.

Dr ir Prem Bindraban
Director, ISRIC – World Soil Information

Key Points

- Rainfed land use has expanded dramatically in the Upper Tana catchment. These lands influence the hydrological regime and represent the main cause of, but also the best solution to, water scarcity.
- The objective of this study was to design and document a financial mechanism for the proposed Green Water Credits Investment Fund: thus (i) studying farmers' preferences for investment mechanisms in soil and water conservation (SWC) or "*green water* management", (ii) identifying and describing models, mechanisms and arrangements for SWC; and (iii) identify potential sources of funding. The conclusions of the study can be summarised as follows:
 - 1:** Smallholder farmers are able to access inputs for soil and water conservation locally; however inputs obtained off-farm require purchases.
 - 2:** Farmers prefer technical assistance and investment support for SWC in the form of short-term production investments; thus a feasible investment mechanism needs to take cognisance of both short-term and long-term investments required.
 - 3:** Smallholders prefer technical support to be given directly by service providers (as grants).
 - 4:** Preferred organisations through which investment support can be channelled varied, with preferences indicated as follows: government bodies, then financial institutions/banks, faith based organisations, community based organisations, and savings and credit cooperatives.
 - 5:** The form of investment support preferred by a majority of smallholders was a shared contribution in which farmers contribute partly in-kind, while being supported by grants.
 - 6:** Potential financial arrangements for Green Water Credits include grant-based models, credit-based models with risk-sharing and/ or loan guarantee mechanisms, and models based on market linkages, with or without grants and credit.
 - 7:** The preferred financial arrangement is a mixture of grants and credit/loans: grants for capacity building, coordination, M&E, contract management and inputs for SWC through (possibly) a voucher system; credit for income generating enterprises with a value-chain approach linked to conservation; a "Sustainable Commercial Investment Package".
 - 8:** The proposed cooperation between GWC and others offers a relevant joining of international funds, combining short-term production and long-term conservation investments.
 - 9:** An institutional arrangement is proposed, involving The Water Resources Management Authority as a lead agency with ties to the Ministry of Water and Irrigation and Ministry of Agriculture, working with both public and civil society technical service providers - a financial service provider reaching 100,000 smallholders, community groups and associations.
 - 10:** Potential funding will come from farmer contributions, water fees channelled to catchment conservation, large water users and international sources. The huge (and sustainable) potential of carbon credits as a result of improved soil and water management should also be explored.

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Acronyms and Abbreviations

2SCALE	Towards Strategic Clusters in Agribusiness through Learning and Entrepreneurship – Ethiopia, Kenya, Uganda, Mozambique
AAA	Accelerating Agribusiness in Africa
AGRA	Alliance for a Green Revolution in Africa
AWSB	Athi Water Services Board
BDI	Brac Development Institute
BDS	Business Development Service
CAP	Community Action Plan
CASE	Competitive Agricultural Systems and Enterprises
CBO	Community Based Organisation
CDD	Community Driven Development
CDFSII	Community Driven Food Security Improvement Initiatives
CDM	Clean Development Mechanism
CFA	Community Forest Association
CGAP	Consultative Group to Assist the Poor
CIG	Common Interest Group
CPC	Community Project Cycle
CWP	Community Water Project
DCU	District Coordinating Unit
DF	Divisional Forum
DTMO/I	Deposit Taking Microfinance Organisation/Institution
ERC	Energy Regulatory Commission
FAA	Focal Area Approach
FADC	Focal Area Development Committee
FBO	Faith Based Organisation
FCI	Farm Concern International
GO	Government Organisation
GoK	Government of Kenya
GPOBA	Global Partnership on Output Based Aid
GWC	Green Water Credits
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Centre
ISRIC	World Soil Information
IWUA	Irrigation Water Users Association
KBP	Kilimo Biashara Partnership
KEEP	Kenya Energy sector Environmental Programme
KENFAP	Kenya National Federation of Agricultural Producers
KenGen	Kenya Electricity Generating Company Ltd.
KFS	Kenya Forestry Service
KPC	Kenya Pipeline Company
KPLC	Kenya Power and Lightning Company
KPRL	Kenya Petroleum and Refinery Ltd.
KVDA	Kerio Valley Development Authority
MKEPP	Mount Kenya East Pilot Project

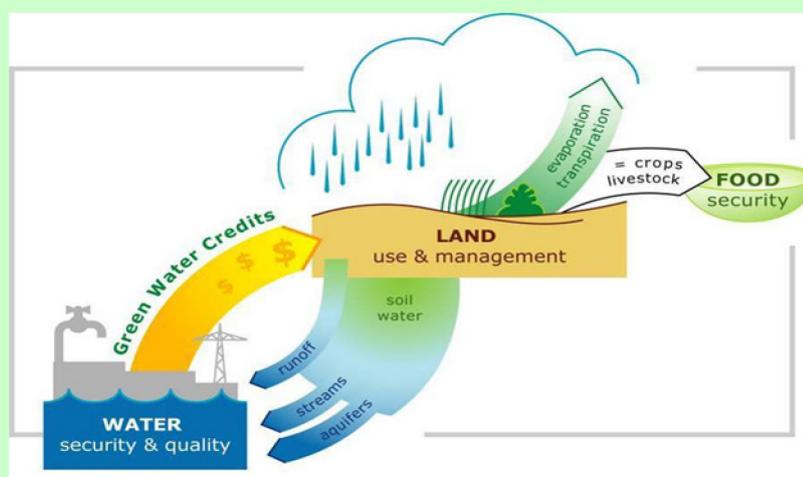
MoA	Ministry of Agriculture
MoLD	Ministry of Livestock Development
MoWI	Ministry of Water and Irrigation
MoU	Memorandum of Understanding
MPC	Micro Project Cycle
NALEP	National Agriculture and Livestock Extension Programme
NGO	Non-Governmental Organisation
NIB	National Irrigation Board
NMK	Njaa Marufuku Kenya
NOCK	National Oil Corporation of Kenya
NRM	Natural Resources Management
NSCP	National Soil Conservation Programme
OBA	Output Based Aid
PCM	Project Cycle Management
PMU	Provincial Monitoring Unit
PMU	Programme Management Unit
POA	Partner Organisation Association
PPIAF	Public Private Infrastructure Advisory Facility
PROFIT	Programme for Rural Outreach of Financial Innovations and Technologies
PSFSI	Private Sector Food Security Innovations
PSO	Private Sector Organisation
RDA	Regional Development Authority
RPIC	Regional Project Implementation Committee
RSF	Risk-Sharing Facility
SACCO	Savings and Credit Cooperative
SF	Stakeholder Forum
SHoMaP	Smallholder Horticulture Marketing Programme
SIDA/Sida	Swedish International Development Cooperation Agency
SOC	Soil Organic Carbon
SSA	Sub-Saharan Africa
SWC	Soil and water conservation
TaNRMP	Tana Natural Resources Management Project
TARDA	Tana Athi River Development Authority
USAID	United States Agency for International Development
WDC	Water Resource Users Association Development Cycle
WFP	World Food Programme
WOCAT	World Overview of Conservation Approaches and Technologies
WRMA	Water Resources Management Authority
WRUA	Water Resource Users Association
WSB	Water Services Board
WSP- AF	Water and Sanitation Programme - Africa
WSS	Water Service and Sanitation
WSTF	Water Services Trust Fund

Green Water Credits: the concepts

Green water, Blue water, and the GWC mechanism

Green water is moisture held in the soil. Green water flow refers to its return as vapour to the atmosphere through transpiration by plants or from the soil surface through evaporation. *Green water* normally represents the largest component of precipitation, and can only be used *in situ*. It is managed by farmers, foresters, and pasture or rangeland users.

Blue water includes surface runoff, groundwater, stream flow and ponded water that is used elsewhere - for domestic and stock supplies, irrigation, industrial and urban consumption. It also supports aquatic and wetland ecosystems. *Blue water* flow and resources, in quantity and quality, are closely determined by the management practices of upstream land users.



Green water management comprises effective soil and water conservation practices put in place by land users. These practices address sustainable water resource utilisation in a catchment, or a river basin. *Green water* management increases productive transpiration, reduces soil surface evaporation, controls runoff, encourages groundwater recharge and decreases flooding. It links water that falls on rainfed land, and is used there, to the water resources of rivers, lakes and groundwater: *green water* management aims to optimise the partitioning between *green* and *blue water* to generate benefits both for upstream land users and downstream consumers.

Green Water Credits (GWC) is a financial mechanism that supports upstream farmers to invest in improved green water management practices. To achieve this, a GWC fund needs to be created by downstream private and public water-use beneficiaries. Initially, public funds may be required to bridge the gap between investments upstream and the realisation of the benefits downstream.

The concept of green water and blue water was originally proposed by Malin Falkenmark as a tool to help in the understanding of different water flows and resources - and the partitioning between the two (see Falkenmark M 1995 Land-water linkages. FAO Land and Water Bulletin 15-16, FAO, Rome).

1 Introduction

1.1 Background

The Tana river rises in the Kenya highlands and receives its water from two “water towers”, the Mount Kenya and the Aberdare Ranges. The source of all fresh water is precipitation which is received, stored and regulated by the soil. So every land use decision is, in effect, also a water use decision. Rainfed land use has increased dramatically over the last few decades in the Upper Tana catchment. These rainfed agricultural lands influence the hydrological regime and represent the main cause of, but also the best solution to, water scarcity.

Water scarcity is increasingly being experienced by water users who rely on Tana basin water resources, as demonstrated by:

- Unsatisfied water demand for Nairobi which is already serious in dry years but will worsen - as population is projected to double by 2030;
- Reduced water supply limiting irrigated production in the Tana basin;
- The endangering of the electricity-generating capacity of dams in the Tana basin by floods, soil erosion and siltation affecting reservoir capacity and damaging turbines. Hydro-electric power generated from the five dams on the Tana river provides Kenya with 80% of its electricity;
- Hydrological changes in the basin; for example permanent rivers that become seasonal, and lowering of groundwater in boreholes.

Recognising the above problems and challenges, in 2007, the Tana river basin was selected to demonstrate the principles of improved *green water* management approach (see “GWC: the concept”). In 2009, the Upper Tana catchment was selected to develop a pilot design of a Green Water Credits facility. The vision of Green Water Credits (GWC) is to develop an investment mechanism for smallholder farmers, livestock keepers and pastoralists in the Upper Tana catchment to implement *green water* management (soil and water conservation: SWC) on a broad scale for the benefit of all water users in the Tana river basin. An innovative self-sustaining financial arrangement is needed to deliver sufficient means and incentives to farmers to invest and implement *green water* management strategies. The Green Water Credits mechanism balances costs and benefits for upstream and downstream parties.

Targets

The targets of implementation by farmers are to:

1. Protect soils in farmland from erosion;
2. Minimise runoff from their fields, therefore optimising infiltration of rainwater; and
3. Reduce unproductive surface evaporation to increase groundwater recharge.

Benefits

The benefits are multiple both on-farm and for all water users in the catchment.

On farmland:

- Reduced erosion on farm land;
- Enhanced moisture content in the soil, which will increase crop transpiration – thus producing higher yields;
- Reduced evaporation, which will potentially mean more water available for transpiration and for recharge of groundwater;
- Improved soil and water management, potentially reducing the variability and risk in production from year to year;

- Improved availability of soil water, thus enhancing the efficiency of fertilizers due to synergistic effects on production factors;
- In the long term – improved biomass production and increased resilience of production system leading to gradual improvement of soil quality, including carbon sequestration.

Downstream:

- Less sediment in rivers and siltation of reservoirs;
- Increased recharge of groundwater;
- Regulated riverflows: decreased peakflows, reduced flooding and enhanced baseflow throughout the year;
- Increased and more stable supply of water for other users - namely cities and irrigated agriculture.

What needs to be done?

Efforts from both public and private parties are needed to reduce surface runoff. An integrated approach to *green water* management needs to be applied. Farmers and pastoralists need to manage rainwater that falls on their land in such a way that runoff will be minimised, infiltration optimised and evaporation reduced. There is much knowledge about a range of practices that could be applied and Kenya has acquired significant experience in soil and water conservation over the past decades.

The GWC would need “seed capital” to be able to pre-finance the initial costs of the GWC system that will be made to:

- Educate and train farmers and leaders;
- Strengthen regional/local communities;
- Provide extra equipment to farmers; and
- Make legal arrangements between parties.

Tana Natural Resources Management Project and GWC Investment Fund

The Government of Kenya (GoK) and the International Fund for Agricultural Development (IFAD) are proposing the *Tana Natural Resources Management Project* (TaNRMP), that will be a follow-up to the Mount Kenya East Pilot Project (MKEPP) and will include a Green Water Credits component. The draft version includes US\$ 10 million for smallholders to support SWC. So far it is proposed that this amount will be used as a risk fund within an overall GWC Investment Fund of US\$ 30 million specifically targeted for SWC. It is proposed to demonstrate the GWC concept/approach in three sub-catchments in the Upper Tana that have substantial land degradation resulting from inappropriate land use: these are the Kayahwe, Lower Chania and Tungu sub-catchments (Figures 1-3).

1.2 Objective of the Study

The objective of the study was to design and document a financial mechanism for the proposed Green Water Credits Investment Fund. In particular to:

- Conduct a study of farmers’ preferences for investment mechanisms for soil and water conservation;
- Identify and describe models and potential financial mechanisms and institutional arrangements for *green water* management; and
- Identify potential sources of funding for soil and water conservation activities.

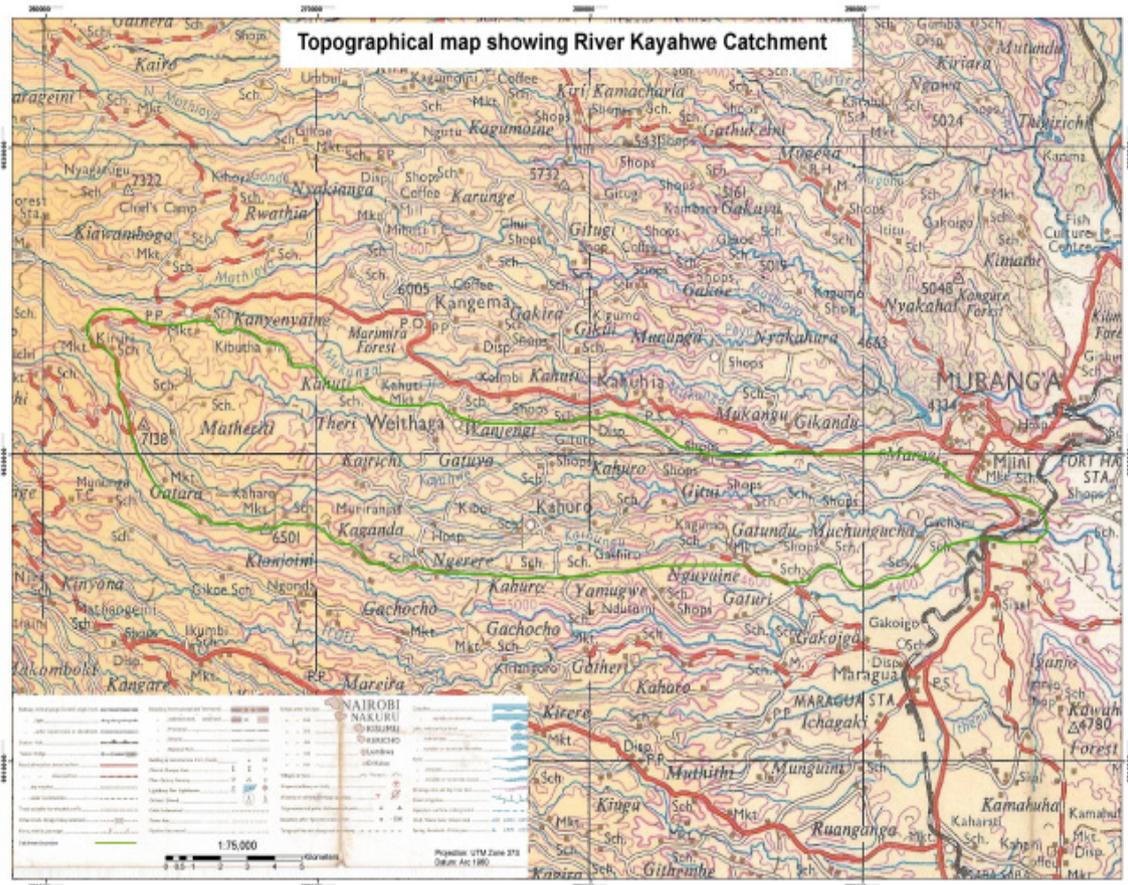


Figure 1
Location map of Kayahwe sub-catchment

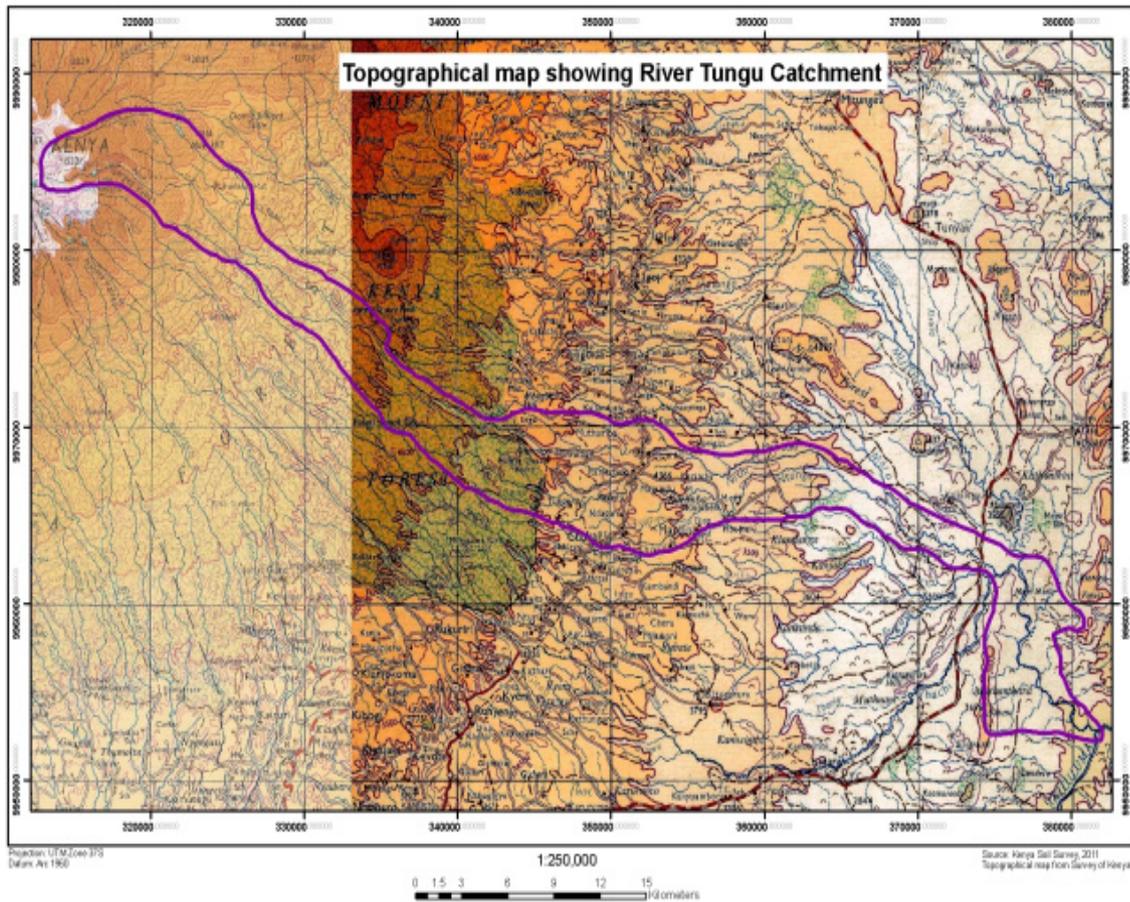


Figure 2
Location map of Tungu sub-catchment

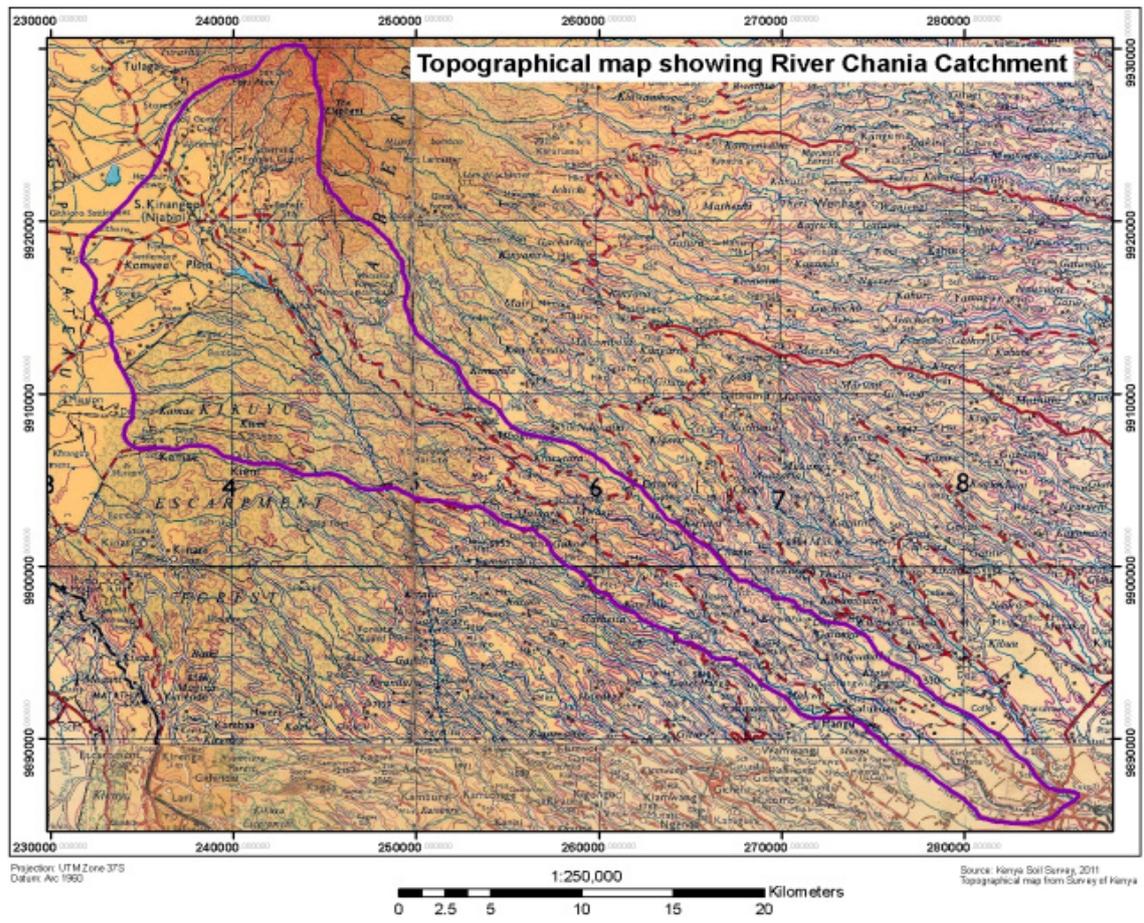


Figure 3
Location map of Lower Chania sub-catchment

2 Approach and methodology

2.1 General approach and methodology

The study was conducted in four steps that were continuous, but discrete in terms of activities undertaken, in order to generate the required outputs. These steps comprised (1) discussions with clients, and development of data collection tools (questionnaire and checklist); (2) field arrangements, logistics and data collection; (3) data entry and analysis; and (4) report preparation.

2.2 Farmers' Preferences

The study to capture farmers' preferences on investment mechanisms was implemented in three sub-catchments in the Upper Tana area, where on-site cost-benefit analyses had been carried out. These were the Lower Chania, Kayahwe and Tungu sub-catchments. The sub-catchments were divided into three categories: Upper, Middle and Lower. In each category farm households that had undertaken soil and water conservation practices were sampled. For each selected farm household the farmer preferences were documented using a household questionnaire (Annex 1). A total of 129 households were interviewed (see Table 1).

Table 1

Distribution of households studied (number of households)

Agro-Ecological Zone	Sub-catchment			Total
	Lower Chania	Tungu	Kayahwe	
Tea-Dairy Zone (LH1)	13	12	8	33
Tea-Coffee (UM1)	14	0	4	18
Main Coffee (UM2)	20	18	19	57
Marginal Coffee (UM3)	0	0	11	11
Cotton-tobacco (LM3-cotton)	0	10	0	10
Total	47	40	42	129

LH-Lower Highlands; UM- Upper Midlands; LM – Lower Midlands

The data collected using the household questionnaire included household characteristics and demographic information; household access to soil and water conservation inputs; type and form of support needed for investing in SWC practices and preferred institutional setting for investment support. In addition to household interviews, key informant interviews were held with the departmental heads of extension staff of the Ministry of Agriculture in Kahuro, Gatundu North and Meru South Districts which covered the three sub-catchments.

Data collected were entered and analysed using MS Excel and SPSS. Data management for quality control was given emphasis both at field level and during computer data entry and analysis.

2.3 Institutional Interviews

Interviews were conducted for selected institutions located in Nairobi and in the Upper Tana catchment area to assess their potential role in the GWC approach to implementing soil and water conservation on a broad scale over the catchment, and to identify potential funding sources and/ or to gather information on models for financial mechanisms targeting smallholders in natural resource management. The checklist used for data collection is presented in Annex 2 while a list of institutions interviewed/contacted is presented in Annex 3. These interviews were augmented by previous ones carried out during the institutional survey (Muchena and Onduru 2011).

- Mt Kenya East Pilot Project (MKEPP)
- Ministry of Agriculture: District Agricultural Extension Officers
- Diocese of Meru, Tharaka-Nithi Deanery
- Water Resources Management Authority (WRMA)
- National Agriculture and Livestock Extension Programme (NALEP)
- Kenya National Federation of Agriculture Producers (KENFAP)
- International Fertiliser Development Centre (IFDC)
- Ministry of Water and Irrigation
- Water Services Trust Fund (WSTF)
- Farm Concern International
- Equity Bank
- KenGen (for off-site Cost-Benefit Analysis)
- Nairobi Water and Sewerage Company (for off-site Cost-Benefit Analysis)
- Yatta Irrigators (for off-site Cost-Benefit Analysis)
- Kakuzi Limited (for off-site Cost-Benefit Analysis)
- Delmonte (Kenya) Ltd (for off-site Cost-Benefit Analysis)

3 Findings

This section provides the findings of the study obtained from the 129 household interviews and key informant interviews. It presents the general characteristics of the households and respondents interviewed, farmer's preferences regarding financial mechanism and a synthesis of institutional interviews on existing financial mechanism.

3.1 Farmers preferences on investment in soil and water conservation practices

3.1.1 Characteristics of households interviewed

a) Population structure and demographic information

The total number of households interviewed was 129. The age of household heads ranges from 25 to 80 years with the majority (72%) between the ages of 25-59 which is considered the productive age bracket at farm level (Table 2). The majority of household heads interviewed were male (Lower Chania 85%, Tungu 95% and Kayahwe 93%) and most of them were married (Lower Chania 87%, Tungu 88% and Kayahwe 88%). About 88% of the household heads were literate. The household heads had spent a mean of 9 years in formal education, attesting to the fact that most of them were literate.

Table 2

Distribution of household heads by age class.

Age cohort	Sub-catchment							
	Lower Chania		Tungu		Kayahwe		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
25-29	1	2.1	2	5.0	0	0.0	3	2.3
30-34	3	6.4	2	5.0	2	4.8	7	5.4
35-39	5	10.6	8	20.0	3	7.1	16	12.4
40-44	5	10.6	6	15.0	6	14.3	17	13.2
45-49	4	8.5	3	7.5	6	14.3	13	10.1
50-54	9	19.1	6	15.0	6	14.3	21	16.3
55-59	6	12.8	3	7.5	7	16.7	16	12.4
60-64	4	8.5	6	15.0	5	11.9	15	11.6
65-69	4	8.5	2	5.0	3	7.1	9	7.0
70-74	4	8.5	1	2.5	1	2.4	6	4.7
75-79	0	0.0	0	0.0	2	4.8	2	1.6
80+	2	4.3	1	2.5	1	2.4	4	3.1
Total	47	100.0	40	100.0	42	100.0	129	100.0

The main occupation of the respondents was farming family fields (78%) with 12% providing labour elsewhere in farming activities and 8% in other off-farm employment activities. About 19% of the households reported that they receive remittances from relatives living in urban centres.

b) Households' access to inputs for soil and water conservation

Labour

Sixty three percent of the households reported that they use their own labour (Lower Chania 70%; Tungu 56% and Kayahwe 63%) for soil and water conservation activities, while a further 31% reported that they have access to hired labour (Lower Chania 30%; Tungu 26% and Kayahwe 38%). Only 8% of households in Tungu reported that they obtain labour from group work (labour work parties).

Planting materials

Seventy four percent of the households reported that they have their own access to locally available planting materials for soil and water conservation while 13% purchase the materials and 9% receive them as gifts (see Table 3).

Table 3

Percentage distribution of households by access to locally available planting materials

	Sub-catchment			
	Lower Chania	Tungu	Kayahwe	Total
Own	79.7	64.5	80.4	74.4
Hired/purchased	15.3	16.1	7.8	13.4
Gift	5.1	11.3	11.8	9.3
Group work	0.0	6.5	0.0	2.3
Credit	0.0	1.6	0.0	0.6
Total	100.0	100.0	100.0	100.0

Seventy one percent of the households reported that they purchase planting materials while 28% reported that they receive them as gifts.

Fertilizers

Most of the households (91%) access inorganic fertilizers through purchase while only 4% access these through credit (see Table 4). The rest pool their resources together to purchase inorganic fertilizers. About 58% of the households have their own sources of organic fertilizers (composts and manures), while 38 % purchase them. The rest (4%) either access organic fertilizers as gifts (2%), through group work (1%) and/or on credit (1%).

Table 4*Percentage distribution of households by access to inorganic fertilizers*

	Sub-catchment			
	Lower Chania	Tungu	Kayahwe	Total
Hired/purchased	95.9	86.4	91.1	91.3
Gift	0.0	9.1	2.2	3.6
Group work ¹	2.0	0.0	0.0	0.7
Credit	2.0	4.5	6.7	4.3
Total	100.0	100.0	100.0	100.0

¹ Group work refers to farmers combing their finances and buying fertilizers as a group

Tools and equipment

Most of the households access tools and equipment for soil and water conservation through purchases (90% of the 129 households) with 53% of the households interviewed having purchased tools and equipment before the survey, while 37% had made recent purchases. About 10% of the households interviewed had access to tools and equipment as either gifts (7% of households), through credit (1%) and/or through activities of groups of which they were members (2%). The tools used for soil and water conservation are also employed in general farming activities.

3.1.2 Farmer's preferences for type and form of investment support in SWC

a) Preferred technical assistance and investment support

Farmers are aware of the need for soil and water conservation and are interested in it. The main causes of continued erosion are presented in Box 1. Some of the farmers, especially in the historically used lands in the heart of the Upper Tana, are applying SWC, although there is scope for improvement. However, there are many others who do not apply, or are inadequately applying SWC; this is especially so in cases where farming has been started recently, i.e. in lower altitude lands. The reasons for not adequately applying SWC are manifold and include lack of technical support and lack of investment capacity. Some of the preferred technical assistance and investment support reported by respondents include the following (percentage of respondents in parenthesis):

1. Technical assistance that includes:
 - a) Advice/extension on SWC practices (97%)
 - b) Training and demonstration on SWC (96%)
2. Investments support that include:
 - a) Inorganic fertilizer (91%)
 - b) Crop protection chemicals (89%)
 - c) Commercially available planting materials (78%)
 - d) Tools and equipment (73%)
 - e) Organic fertilizer (70%)
 - f) Labour (63%)¹
 - g) Locally available planting materials (53%)

¹ This is percentage of households who rely on family labour only and would like to have additional support.

The farmers' prime interest is in production and therefore in seasonal inputs, including inorganic fertilizers, crop protection materials, planting materials, tools and equipment, organic fertilizers and labour. Farmers interests are also in conservation and improvement of the production resource base, hence in SWC. However, many on-farm benefits only become visible in the long-term and a favourable cost-benefit ratio is not apparent in the short-term, therefore in general farmers are reluctant to adopt SWC unless supported.

Box 1

Main causes of soil erosion

Main causes of continued erosion are:

- Poor maintenance of established SWC measures. When prices of commodities are low, motivation of investment in maintenance decreases.
- Continued cultivation of riverine areas.
- Soil and water conservation in maize fields is often below par.
- A part of the farmers do not yet practice adequate SWC measures.
- Isolated hot-spot areas where erosion has progressed too much and land is not easy to rehabilitate by normal agricultural practices.
- Overgrazing in the common lands is frequent resulting in bare soils and high erosion rates during rains. Due to population pressure in the upper zones, there has been high migration and settlement in the lower zones, where migrants changed to sedentary farming in the fragile environment.
- All this indicates that there is still need to intensify farmer education in the heart land of the Upper Tana catchment, and with particular focus on water harvesting in lower zones, promoting microcatchments, ridging and tied ridging technologies that were not found to be widely adopted.

Source: Muriuki and Macharia (2011)

An effective investment mechanism should therefore look into both the short-term production investments and the long-term investments in SWC activities. The mechanism should also recognise relatively initial establishment costs of many SWC investments *vis-a-vis* maintenance costs that are generally lower but crucial to prevent degradation of the measures installed. Also, a continuous effort should be made to increase the area with SWC measures to enhance the overall regional efficiency.

b) Form of support

With regard to the form of support required in the area of training for implementation of SWC practices the respondents mentioned the following (percentage of households in parenthesis):

- Terrace layout and construction (47%);
- Soil erosion control (21%);
- Training on conservation measures (5%);
- On-farm water harvesting (5%);
- Training on group dynamics (4%);
- Maintenance of structures (3%);
- Agroforestry (3%);
- Composting and manure use (3%); and
- Napier grass strip planting and grass (structure stabiliser) establishment (2%).

These areas thus comprise both inputs and technical advice - and some are quite specific, other broad.

Other areas of support required for training regarded zero tillage, fodder crop production, roof water catchment techniques and emerging technologies on soil and water conservation, crop disease control and

tree planting. A similar response was received for the type of support required on advice/extension on implementation of SWC practices. Asked about the form of support required on locally available planting materials, various responses were received (see Table 5) with some respondents preferring support in accessing the planting materials themselves, labour for planting and others requesting knowledge about planting materials.

Table 5
Percentage distribution of households by form of support required-locally available planting materials

	Sub-catchment			Total
	Lower Chania	Tungu	Kayahwe	
Agroforestry	24.0	0.0	0.0	8.8
Napier grass strip planting	28.0	10.7	26.7	20.6
Grass establishment	0.0	3.6	13.3	4.4
Stabiliser materials	8.0	0.0	13.3	5.9
Better methods of planting	0.0	7.1	0.0	2.9
Napier grass/grass planting	16.0	21.4	0.0	14.7
Labour for planting	0.0	25.0	26.7	16.2
Knowledge about planting materials	16.0	10.7	20.0	14.7
Utilisation of local materials	0.0	14.3	0.0	5.9
Fodder trees	8.0	7.1	0.0	5.9
Total	100.0	100.0	100.0	100.0

With regard to commercially available planting materials most of the respondents (74%) would prefer to have access to the materials (planting materials and fodder trees). Only a very small number of respondents (13%) said they would need financial support while a further 14% would also need extra labour for planting the materials.

With regards to inorganic fertilizers, the preference of the majority was that the inorganic fertilizers be availed at subsidised prices (56% of total households) while nearly an equal total proportion of the households, 15% and 16%, preferred being given credit (low interest loan) and direct cash respectively to purchase fertilizers. A further 7% preferred inorganic fertilizers being provided as a grant (Table 6).

Table 6*Percentage distribution of households by form of support required: inorganic fertilizers*

Form of support	Sub-catchment			
	Lower Chania	Tungu	Kayahwe	Total
Finance (direct cash)	8.5	26.1	11.5	16.0
Loans/ provide on low interest credit	2.1	37.0	0.0	15.1
Grants	0.0	17.4	0.0	6.7
Subsidised fertilizers	80.9	13.0	84.6	55.5
Provide service on soil testing	0.0	2.2	0.0	0.8
Stock closer to farmers	0.0	2.2	0.0	0.8
Training on how to apply fertilisers	8.5	2.2	3.8	5.0
Total	100.0	100.0	100.0	100.0

When asked about the form of support required regarding organic fertilizers, the majority of the households (62%) said they required training on preparation of these while a further 21% and 13% of the households preferred support in terms of grants/finances and accessing labour respectively. A minority of the respondents either preferred support in terms of low interest loan/credit (2%) or in the form of price subsidy (2%).

Famers listed six major areas of preferences in terms of support and investment for crop protection issues. These include providing agrochemicals at subsidised prices (53%), financial support including loans and grants (17%), low interest loans/credit (15%), equipment for crop protection including knapsack sprayers (10%) and training on the use of agrochemicals (5%).

The majority of the respondents preferred tools and equipment being given directly to farmers as a token/incentive (56% of respondents); although the percentage of households preferring this method varied from one sub-catchment to another with most favouring this in Lower Chania and Kayahwe. A nearly equal proportion of the households, 18% plus 19%, preferred being given credit (low interest loan) for tools and for finance (unspecified) respectively to purchase tools and equipment (Table 7). This latter option was preferred by majority in Tungu sub-catchment.

Table 7*Percentage distribution of households by form of support required: tools and equipment*

Form of Support	Sub-catchment			
	Lower Chania	Tungu	Kayahwe	Total
Finance (form unspecified)	0.0	42.4	15.0	19.1
Provide low interest credit/loan	11.1	36.4	0.0	18.0
Subsidised prices	2.8	9.1	0.0	4.5
Provide tools (fork <i>jembe</i> , shovel, <i>panga</i> , wheelbarrow)	86.1	6.1	85.0	56.2
Training on use of tools	0.0	6.0	0.0	2.2
Total	100.0	100.0	100.0	100.0

3.1.3 Farmers preferred institutional arrangements for investment support

With regards to arrangements for investment support, most of the respondents preferred arrangements involving Government bodies (43% of respondents), Financial institutions/banks (15%), Faith Based Organisations (14%), Community Based Organisations (12%) and SACCOs (10%) (Table 8). However, most respondents in Tungu and Kayahwe sub-catchments preferred Government bodies (53% and 55% respectively) while those in Lower Chania sub-catchment preferred Faith Based Organisations (32%) followed by Government Organisations.

Table 8

Percentage distribution of households by preferred arrangement for investment support with SWC.

Organisation	Sub-catchment			Total
	Lower Chania	Tungu	Kayahwe	
Community based organisation (CBOs)	14.9	10.0	9.5	11.6
Faith Based Organisation (FBO)	31.9	5.0	2.4	14.0
SACCOs	4.3	12.5	14.3	10.1
Government bodies (GO)	23.4	52.5	54.8	42.6
Non-Governmental Organisation (NGOs)	2.1	5.0	14.3	7.0
Financial institutions/Banks	23.4	15.0	4.8	14.7
Total	100.0	100.0	100.0	100.0

The majority of the farmers interviewed (69%) perceived that one organisation could not handle investment support alone. The preferred mode of support is through Government organisations working with other organisations. The majority of respondents (43% of total) who selected government organisations as their first choice, further said that government bodies should not work alone but with financial institutions, Faith Based Organisations, Community Based Organisations, SACCOs and Non-Governmental Organisations (Table 9).

Asked about the form of investment support that might be preferred in implementing *green water* management measures, the majority of the farmers (61%) preferred shared contribution, under which the farmers contribute partly in-kind while the Green Water Credits meet other obligations in the form of grants. About 39% of the respondents preferred the investment support to be in the form of low interest loans.

Table 9*Farmers preferred mix of organisations that can work together on investment mechanisms*

Preferred first choice organisation (A)			Preferred organisation (s) to work with first Choice Organisation		
Organisation	No. of respondents selecting the organisation		Organisation(s) suggested	No. of respondents selecting the organisation	
	No 'A' (sub-total)	Respondents (% of total)		No.	Respondents (% of sub-total in A)
Community based organisation (CBOs)	15	12	Faith Based Organisation (FBO)	4	27
			SACCOs	1	7
			Government bodies (GO)	2	13
			Non-Governmental Organisation (NGOs)	2	13
			Financial institutions/Banks	6	40
Faith Based Organisation (FBO)	18	14	Community based organisation (CBOs)	2	11
			SACCOs	3	17
			Government bodies (GO)	8	44
			Non-Governmental Organisation (NGOs)	3	17
			Financial institutions/Banks	4	22
SACCOs	13	10	Community based organisation (CBOs)	2	15
			Faith Based Organisation (FBO)	6	46
			Government bodies (GO)	3	23
			Non-Governmental Organisation (NGOs)	1	8
			Financial institutions/Banks	6	46
Government bodies (GO)	55	43	Community based organisation (CBOs)	7	13
			Faith Based Organisation (FBO)	13	24
			SACCOs	5	9
			Non-Governmental Organisation (NGOs)	3	5
			Financial institutions/Banks	16	29
Non-Governmental Organisation (NGOs)	9	7	SACCOs	2	22
			Government bodies (GO)	2	22
			Financial institutions/Banks	1	11
Financial institutions/Banks	19	15	Community based organisation (CBOs)	3	16
			Faith Based Organisation (FBO)	4	21
			SACCOs	8	42
			Government bodies (GO)	3	16

3.2 Perspectives on potential financial mechanisms and institutional arrangements

This section gives a synthesis of existing financial mechanisms in the country and institutional arrangements relevant for the GWC. It also discusses the potential financial sources for SWC.

3.2.1 Existing case models on financial mechanisms for natural resource management related interventions

The study documented three models of financing natural resource management-based interventions during interviews with various organisations and stakeholders in the finance and credit market. The models were grouped as follows:

(A) models based on grants to beneficiaries;

(B) models based on loans with risk-sharing strategies and guarantee mechanisms;

(C) models based on value chain development and market linkages, with or without grants. The categories are not discrete; they overlap in various ways. A synthesis of these models as described by various stakeholders is given below:

a) Models based on grants to target groups

Models based on providing grants to communities for conservation activities, natural resource-based livelihood activities, income generation and/or food production take various shapes and forms (see Text Boxes 2-8) but with the following characteristics:

- Targeting legally registered community based groups or associations (self-help groups, associations, Public trusts etc.) with a group approach is seen as an efficient way of carrying out conservation and/ or livelihood activities. The groups are registered with relevant government departments and with organisations spearheading the interventions.
- Communities participating in the interventions partly contribute to offsetting project activity costs either in kind (dominant) or in cash. The in-kind contributions range from 10-30%. Grant-based models often have Government of Kenya participation in partnership with donors and/ or credit lending agencies.
- Community groups access the grants through a proposal submitted to partner organisations, which screens the proposals through various stages before approval.
- Grants are given in various forms, including cash grants, vouchers that are redeemed at particular stores, tools-for-work, food-for-work, cash-for-work etc. Soil and water conservation programmes in Kenya have experimented with all of the afore-mentioned forms of grants/incentives or subsidies to farmers.
- The communities are trained in the use of funds and project implementation is monitored by partner organisations.
- Grants given to community groups are not returned to source but rather used to establish a revolving fund; but some community groups may set-up income generating projects that allow them to establish an internal revolving/credit system at group level.
- Run, often, through Project Management/Coordination Unit with implementation committees at District and Divisional levels when Government bodies are involved; and/or stakeholder fora at various administrative levels.

Box 2

Food-for-Asset Model

The Catholic Diocese of Meru through its Tharaka-Nithi Deanery is implementing a livelihoods programme in Tharaka North and Tharaka South Districts in partnership with the World Food Programme (WFP) and Equity Bank. The programme operates in 17 Locations targeting 5,172 households with a population of 31,030 people.

The aim of the WFP is to save lives through giving relief food: cereals, pulses and fats. However, WFP realising that the community also needs other items like vitamins and other household requirements opted to give cash and sensitise a few traders who could buy food to ensure that it was available to the communities to buy.

The target population constitutes the vulnerable households. A criterion for identification of the vulnerable is set by the community who rank the households in the 17 locations in terms of vulnerability. From each village those identified as vulnerable community members form groups (15-20) and elect their own committee and leaders who are trained on group dynamics, reporting and layout of rainwater harvesting structures. The training is carried out by the WFP in collaboration with Ministry of Agriculture extension staff.

The WFP has partnered with the Equity Bank for disbursement of cash to vulnerable members who have accomplished the tasks as agreed upon. Equity Bank registers the identified beneficiaries, trains them on basic financial management and gives them ATM cards for withdrawing the money given to them for buying food.

The Tharaka-Nithi Deanery oversees the implementation of activities by the beneficiaries. Each beneficiary is supposed to work for an equivalent of 12 days in a month on rainwater harvesting activities. During this period the Catholic Diocese gives the beneficiaries 50% of daily ration equivalent to 1050 calories translated into cash. At the end of every month the Tharaka-Nithi Deanery submits three types of reports to WFP;

- Output reports showing the accomplished activities of each beneficiary during the 12 days.
- Narrative report showing the approaches used and the challenges encountered during that month.
- List of beneficiaries showing the type of activities accomplished and the number of days they have been able to meet the work norms.

Once WFP receives the reports from the Tharaka-Nithi Deanery, it calculates the money and forwards it with the list of beneficiaries to the Equity Bank. The Bank then credits the accounts of the beneficiaries with equivalent amounts. Each beneficiary who has accomplished the desired output receives an equivalent of KSh 3000 depending on price of commodities.

The WFP takes care of the logistics (Staff and transport costs). WFP also meets the cost of the ATM cards and at least two withdraws for each beneficiary. WFP is also involved in initial planning and monitoring and evaluation of the project.

Challenges:

During implementation of the tripartite agreement the following challenges have been encountered:

- Delay in disbursement of funds (transactions can take up to three weeks);
- Need for close monitoring of the communities to ensure that each beneficiary actually accomplishes his/her tasks;
- Need to change attitude towards stakeholder engagement. There is need for a Memorandum of Understanding (MoU) between partners.

Lessons learnt:

- There is need to take care of partnership process to ensure that the stakeholders are actually involved in the implementation of project activities.
- Need for funding of local partners to ensure that they can engage with the communities effectively.
- Capacity building of communities should be accompanied by support for interventions i.e. administration and actual implementation.
- It is important to have clear Terms of Reference for implementing partners which take into account community perceptions and interests.

Source: Discussions at Tharaka-Nithi Deanery on 25/7/2011

Box 3

Indirect incentive based model - a historical perspective

Land degradation was identified as the most severe environmental problem in Kenya in the early 1970s. The Kenyan Government soon set-up a Soil and Water Conservation branch in its Ministry of Agriculture, assisted by funding from the Swedish Government. Kenya established a National Environmental Secretariat and a Permanent Presidential Commission on Soil Conservation and Afforestation in the mid-1980s. In 1989, the government established a Ministry for Reclamation and Development of Arid, Semi-arid and Wastelands.

Alongside the focus on institutional development for soil conservation, Kenya started a soil and water conservation project with technical and financial assistance from Sweden in 1974. The project later expanded into a fully-fledged National Soil Conservation Programme covering the whole country. The direct incentives used in the Kenyan soil conservation effort included Food For Work, provision of hand tools, and materials for on-farm gully control. The Kenyan approach to soil conservation emphasised indirect incentives such as training, technical assistance and extension services, and focused on private farm and later the catchment approach in 1987 with a catchment committee set-up to coordinate activities.

Earlier evaluation of the adoption of soil conservation practices at the farm level showed that the areas where adoption of soil conservation was highest were those where farmers had secure land tenure rights. The project was also successful in development of simple extension messages which farmers easily understood, and well-conserved farms were a source of pride for the farmers. Several factors have contributed however to the limited success of soil conservation in Kenya. Despite the emphasis given to indirect incentives, the incentives were deemed inadequate. Owing to the limited research on land management and soil conservation, the conservation practices suffered from the lack of a sound scientific and technical basis. Perhaps more important has been the lack of involvement of beneficiaries in the planning and implementation of conservation projects and programmes. Also, most of the community-based activities were not sustainable in absence of free farm tools and inputs. Many groups disintegrated and the soil and water conservation activities collapsed after the end of donor support. The catchment committees also stopped the coordination roles.

Source: Gebremedhin 2004; Mutisya *et al.* 2010

Box 4

Model of Water fees for Conservation through WRMA/WSTF

WATER SERVICES TRUST FUND (WSTF) is a State Corporation established under the Water Act, 2002 with the mandate “to assist in financing the provision of water services to areas of Kenya which are without adequate water services”. The organisation is guided by the Trusts Deed of 26th April, 2004 and nested in rapid, proactive and innovative measures stipulated in its core values of accountability, transparency, good governance, teamwork, equity, fairness, honesty, integrity, customer focus, and life-work balance. WSTF is one of the water reform institutions, and acts as a basket fund for mobilising resources and providing financial assistance towards capital investment costs of providing Water Service and Sanitation (WSS).

WSTF and WRMA (2009) published the Water Resource Users Association (WRUA) Development Cycle (WDC) which is a transparent process designed to provide technical and financial support for community-based activities in water resource management. The WDC is based on the Integrated Water Resources Management approach which recognises that water resource management cannot be done properly without involving different components including:

- Institutional capacity;
- Technical knowledge;
- Financial resources;
- Stakeholder participation; and
- Coordination and collaboration.

WDC recognises that conserving catchments and engaging in water resource management activities is a long-term process that requires continuous participation by many stakeholders involving different kinds of interventions. WDC has therefore been designed to foster a long term relationship between WRMA and the WRUAs to continuously build WRUA capacity to implement integrated water resource management activities.

The WDC outlines the conditions for applying for funds, the eligible activities, the funding ceilings, and the appraisal of the WDC applications, contract and release of funds, implementation, reporting and monitoring. The WDC also clearly spells out the role of the various institutions and stakeholders involved with respect to WDC processes.

WSTF provides grants to WRUAs which have met specified conditions for implementation of activities eligible for WDC funding such as conservation and rehabilitation of catchment and riparian areas, strengthening WRUA management systems etc. The following funding ceilings have been set according to whether the WRUA has proven itself capable of utilising and accounting for funds properly:

- KSh 1 million for a newly established WRUA with no proven track record;
- KSh 2 million, 5 million or 10 million for a mature WRUA with proven record of accountability for previous funds.

In addition there is an upper ceiling of KSh 50 million to any one WRUA over a 10-year period.

Source: Interviews for this report on date 3/8/2011: WSTF Publications (Daily Nation, Friday June 10, 2011) and WSTF Strategic Plan 2008 - 2013.

Box 5

Natural Resource Management Project: Micro-grants system through World Bank Credit Facility

The Natural Resource Management (NRM) Project is funded by the Government of Kenya through a World Bank credit facility amounting to US\$ 68.5 million. The objective of the NRM project is to enhance institutional capacity to manage water and forest resources in a sustainable and participatory way. Partner organisations in this project include the Water Resources Management Authority (WRMA), The Kenya Forestry Service (KFS) and the National Irrigation Board (NIB).

The third component provides investments in livelihood enhancing community projects, and provides a demand-driven window of funding for livelihood investments in the Upper Tana catchment using a Community Driven Development (CDD) approach.

The micro-grants offered in this project targets community self-help groups especially those having activities in the following sectors: fisheries; agriculture/horticulture; irrigation; livestock production; forestry and tree nursery development; food processing; improved fuel use efficiency; power production based on renewable energy; (construction) block making; projects based on the utilisation and/or improvement of natural resource base; and CBO Capacity building.

Using the CDD approach Micro Project Grants are provided to community groups up to a ceiling amount of KSh 1 million, meeting a maximum of 70% of the cash requirements of livelihoods enhancing micro-projects.

To access the micro-grants community groups, the NRM Livelihood Micro-Project Cycle (MPC) is followed. Groups are required to write a proposal that they submit through partner organisations for screening and eventual transmission to the Natural Resource Management (NRM) Secretariat for further screening and approvals. The NRM secretariat screens the proposals and sends to the Regional Project Implementation Committee (RPIC) for selection/confirmation. This is followed by public adverts of conclusions of selection before field verification/groundtruthing is done. Once groundtruthing is completed, a contract agreement is prepared and the NRM Secretariat releases funds to the community self-help group that had applied. Monitoring during implementation is done by the CBOs and Partner Organisation Associations (POA). A project is deemed complete when a Certificate of Completion has been signed by the relevant partner organisation.

Community self-help groups eligible for the micro-grants are required to have been registered, be active and have field activities on-going, have a bank account, provide evidence that they will meet a third of the costs of the project as evidenced by such an amount in their bank account and be registered with one of the following: a Water Resources Users Association (WRUA), a Community Forest Association (CFA) and or an Irrigation Water Users Association (IWUA). The micro-projects funded have a 12-month time frame.

n.b. NRM mainly targets land users in the forested areas and the downstream irrigated areas but hardly the rainfed agricultural areas, which is the main focus of GWC; NRM is not targeted at soil and water conservation on a large scale.

Source: Natural Resource management project: Upper Tana Catchment Livelihood Component Operations manual, 2011; WRMA Website.

Box 6

Smallholder Horticulture Marketing Programme (SHoMaP)

The Smallholder Horticulture Marketing Programme (2007-2013) is a pilot programme. The aim of the programme is to increase incomes and reduce poverty among poor rural households in medium-high potential farming areas for which horticulture is a source of livelihood; and to increase the health and welfare of Kenyans by improving the quality and increasing the quantity of horticultural produce consumed within the country. The programme's main beneficiaries are smallholder farmers, the unemployed landless and the players in the chain input and produce markets - as well as consumers. The programme identifies and tackles constraints in the supply of inputs and linkages to marketing chains and invests in building value chains and the capacity of private sector service providers, government institutions and farmers' organisations.

Partners in the Programme are the Kenyan Government (Ministry of Agriculture as lead Agency) and IFAD. The funding structure is as below:

Total cost:	US\$ 26.6 million
Approved IFAD loan:	US\$ 23.43 million (88% of total programme costs)
Approved IFAD grant:	US\$ 500,000
GoK contribution:	US\$ 1.62 million (6.1% of total)
Beneficiary contribution:	US\$ 1.04 million (3.9% of total)
Duration:	2007-2013
Directly benefitting:	12,000 households (60,000 farmers; 600 farmer groups)

About half of the resources employed in the programme are used to improve fiscal access of rural households to markets. The remainder is used to support measures which improve on the efficiency of agricultural input and produce markets and of raising value addition of horticultural products between the point of harvest and the consumer. Key officers from the Ministry of Agriculture work in collaboration with relevant officers from the Ministries of Roads and the local Government to fast-track demand-driven investments in market infrastructure.

SHoMaP covers 14 horticultural producing districts; Nyanza-Kisi and Gauche, Western Province;- Bingaman South, West, North, & East districts,-Rift Valley;- Burets and Nandi South, Eastern Province;- Embu, Imenti North, Meru Central and Imenti South;- Central Province;-Nyandarua North and South. SHoMaP has four components:

(i) Domestic market system analysis-meant for decision making on the improvement of input-output markets. Studies include participatory value chain analysis of three target horticultural crops per district, district mapping of stockists and nation-wide studies of upstream input and downstream horticultural produce marketing and domestic price instability;

(ii) Institutional strengthening- capacity building of players in the horticultural value chain. Support is targeted at existing informal groups, input stockists, produce traders and brokers, traders, purchasing agents, market managers and other relevant players, government staff and other service providers and institutions that support development of efficient market information systems and development of horticulture policy, legislation and appropriate regulations for the horticulture sub-sector.

(iii) Investments in support of domestic value chains-grants are provided for investments in market infrastructure that break constraints and reduce price instability. Farmer groups access the grants on the basis of a viable investment proposal. Example of infrastructure includes access roads and irrigation systems.

(iv) The Programme management and coordination-Programme Management Unit (PMU) is based in Nakuru. The PMU coordinates the facilitation of programme districts to plan and coordinate implementation of demand-driven market intervention activities and support the capacity building needs. The PMU is also responsible for financial oversight, monitoring, impact assessment and evaluation.

By submitting proposals through the District Horticulture Sub-Committee, the horticulture stakeholders and farmer groups have been able to access funding from SHoMaP.

Source: IFAD; PMU (Nakuru) Reports

Box 7

Njaa Marufuku Kenya

Njaa Marufuku Kenya (NMK) Programme (2005-2015) was formulated by Agriculture Sector Ministries to fast track the fulfilment of the first Millennium Development Goal (MDG-1). The overall objective of NMK is to contribute to reduction of poverty, hunger and food insecurity among poor and vulnerable communities in Kenya by 2015. NMK supports community driven agricultural development initiatives targeting the extremely poor and vulnerable groups with interventions for increasing agricultural productivity, food utilisation, agro-processing and value-addition, health and nutrition improvement, and water harvesting and conservation of the natural resource base. NMK has three components, with components 1 and 3 having some bearing on Green Water Credits:

- Community Driven Food Security Improvement Initiatives (CDFSII) (**component 1**): NMK provides *small grants* to community groups to upscale agricultural activities that focus on hunger, poverty reduction and income generation. Activities in focus include small-scale irrigation and water harvesting technologies, production of high value crops, support to value-addition and marketing of agricultural produce, *environmental conservation*, draft animal technology adoption, promotion of livestock enterprises and fish farming, artificial insemination services and animal health services.
- Support to Private Sector Food Security Innovations (PSFSI) (**component 3**): Focuses on public-private sector partnership aimed at improving food access through promotion of income and alternative livelihood sources. NMK supports registered Community Based Organisations (CBOs), Non-Governmental Organisations (NGOs), Faith Based Organisations (FBOs) and Private Sector Organisations (PSOs) to upscale hunger and poverty reduction innovations that have the potential to be replicated. Activities funded include extension service delivery, water harvesting technology transfer, capacity building, crop and animal husbandry, small-scale irrigation technology transfer, *environmental conservation and soil improvement*.

NMK has a secretariat based in Nairobi (national) and works through Provincial Monitoring Units (PMU), District Coordination Units DCU, Divisional Implementation teams and Community Group Facilitators (attached to community group). NMK provides grant of KSh 120,000 to 150,000 for each supported group. The funds are used for capacity building-KSh 40,000; and as seed capital-KSh 80,000 to 110,000; this is for the group's investment costs (seeds, fertilizer, equipment, breeding stock, fingerlings, construction materials, processing equipment, packaging, marketing etc.) as per the proposed budget.

To access grants under the programme, community groups write proposals which they forward to District Coordination Units (DCU) for forward transmission to NMK Secretariat for consideration. The DCU gives an introductory letter to each group to take to a reputable bank or SACCO for the purpose of opening an account with an officer appointed by the DCU as a mandatory signatory. When community proposals are approved, the use of grants is guided by the DCU and divisional implementation teams according to activities outlined in the proposal.

It targets registered, organised and active group members and provide a grant of between KSh 120,000 and 150,000 per community group; The grant is used for environmental conservation among other community projects

Source: www.kilimo.go.ke/njaa_marufuku

Box 8

NALEP Stakeholder Fora Model

The National Agriculture and Livestock Extension Project (NALEP) is jointly implemented by the Ministry of Agriculture (MoA) and the Ministry of Livestock Development (MoLD).

NALEP's mission is to provide and facilitate pluralistic and efficient extension services for increased production, food security, higher incomes and improved environment. Its purpose is that: "Pluralistic, efficient, effective and demand-driven extension services are promoted and functional". The specific objectives of NALEP are:

- To institutionalise demand-driven and farmer-led extension services.
- To increase the effectiveness of pluralistic provision of extension services.
- To increase the participation of the private sector in providing extension services.
- To empower farmers to take charge of Project Cycle Management (PCM) of extension projects.
- To develop accountability mechanisms and transparency in delivering extension services.
- To facilitate commercialisation of some of the agricultural extension services.

Currently NALEP is operating in Phase II which will end in December 2011. NALEP uses the Focal Area Approach (FAA) for providing extension services.

NALEP's strategy to achieve its goal is through formation of Focal Area Development Committees (FADCs) in areas which comprise 2000 to 6000 farmers. In each focal area NALEP, in collaboration with farmers, carries out a participatory rural appraisal which identifies development problems at community level culminating in development of Community Action Plans (CAPs). The CAPs are expected to act as bargaining tool for the FADCs to mobilise and access resources and also to assess their rural development over time. NALEP extension staff, taking into account the prevailing technical challenges faced by agriculture in the focal areas, identify "viable agricultural enterprises which have potential of improving agricultural yields and boosting household food security and incomes". NALEP then brings together interested farmers into Common Interest Groups (CIGs) to address specific enterprises. Some of these CIGs are involved in soil and water conservation activities.

In the course of implementation of NALEP over the years it has been found that it is important to have institutional arrangements that bring together all the stakeholders who have interests in certain enterprises. Thus NALEP has introduced the Stakeholder Forum (SF) at different levels; National, Regional, District and Divisional. The stakeholder forum is farmer-led and has representation from Government Organisations (GOs), Community Based Organisations (CBOs), Faith Based Organisations (FBOs), Farmer Organisations, Non-Governmental Organisations (NGOs) and the private sector.

The Stakeholder Forum is responsible for the following functions:

- Conflict resolution;
- Coordination of implementation;
- Decision-making on allocation of resources.

Taking into account the New Constitution (NC) and the envisaged institutional arrangements it is anticipated that Stakeholder Forums will be held at the following levels:

- County level;
- Sub-County level (current Districts);
- Divisional level.

Below the Divisional Forums (DF) are the Focal Area Development Committees (FADCs) who work together with community groups (Common Interest Groups - CIGs - as known in NALEP). The FADCs and community groups should be registered as Self Help Groups or Associations in order to have legal status.

It should however, be noted that the stakeholder forums are at various stages of strength, and need to be fortified through capacity building (training) on resource mobilisation and management. In NALEP the stakeholder forums are given KSh 500,000 to manage for the CIGs. Some of the WRUAs draw membership from registered Self Help Groups, but not CIGs; although linkages can be worked out.

Source: Interviews, NALEP, Nairobi on 2nd August 2011

b) Models based on loans with risk-sharing/loan guarantee fund system

Models based on loans with risk-sharing and or loan guarantee system recognise that lending to smallholder farmers sector is risky due to the vagaries of weather, pests and diseases and inadequate collateral. The risk-sharing mechanism or loan guarantee reduces the risk of lending by covering a portion of any loan default, bringing potential losses for the bank to a reasonable percentage. Examples of these case models as described by respondents are given in Boxes 9-11. These models are characterised by the following:

- Including banks/lending institutions in the model design to offer loans and administer credit scheme to smallholder farmers targeting selected crop and/or livestock enterprise, business entity (e.g. agrovets) etc.;
- Integrating risk-sharing mechanisms where a partner organisation in the model sets up a fund to cater for risks that banks would incur in the eventuality that smallholders default or production is negatively affected by the vagaries of weather. Similarly, the government may leverage the lending risks to the vulnerable by providing subsidies e.g. in the form of redeemable vouchers under the scheme.
- Loan issue in-kind for targeted activities rather than in cash: seeds, fertilizers, tools etc. In some of the models farmers are given vouchers redeemable at agrovet stores or particular shops.
- Loans issued either at market lending rates or at negotiated interest rates and pay-back period
- Approaching the issue of collateral in different ways including:
 - Using output-based subsidy as partial security/collateral-only for those projects that promise a high probability of achieving the pre-determined outputs. The subsidy reduces the total loan sizes and ensures that debt service remains affordable
 - Development of loss-sharing guarantees: partial credit guarantee by partner organisations to address limited availability of other collateral by community groups
 - Increasing analysis of socio-economic feasibility and audits of the community projects to be funded
 - Debenture and Chattel mortgage (fixed and floating assets including those newly acquired and project cash flows)
- Loans issued to legally registered community groups, societies, public trust and individual farmers guaranteed by group members (group lending methodology) and or partner organisations upon application or submission of proposals.
- Loans issued focussing on income generating enterprises (high value crops under irrigation and/ or rainfed farming, livestock with high returns etc.) that would allow farmers to pay back.
- Both loans and grant facilities included in a model to enhance the impacts. The latter is used for capacity building and training in the value chain, community group, proposal development, subsidising costs of inputs to reach the vulnerable etc.

Box 9

Kilimo Biashara

Kilimo Biashara Partnership (KBP) involves Equity Bank, The Alliance for a Green Revolution in Africa (AGRA), the International Fund for Agricultural Development (IFAD), the Government of Kenya and Amiran Kenya. The programme was launched in May 2008. The Kilimo Biashara Partnership provides a low interest loan facility for smallholder farms and enterprises in the agricultural value chain to enable access to resources that will improve productivity and food security as well as expand farmers' income base in Kenya. The programme is meant to turn smallholder's agricultural subsistence into viable businesses.

Banks have historically viewed lending to smallholders sector as high risk because the industry is at the mercy of the weather, pests and price fluctuations and smallholders lack usable collateral. In order to promote lending to those in the agricultural value chain, Kilimo Biashara partners have come together to set-up "loan guarantee" funds which leverage large low interest loans from commercial banks. The guarantees reduce the risk of lending by covering a portion of any loan default and bringing potential losses for the bank within a reasonable percentage. Also, the loan guarantee helps in business training to farmers, agro-dealers and managers as well as in assisting with loan applications (opening bank accounts, ATM cards etc.).

AGRA and IFAD provided US \$2.5 million each as a loan guarantee. In addition:

- Equity Bank administers the credit programme and contributes US\$ 50 million for low-interest loans available to 2.5 million farmers and 15,000 agri-businesses. The loans carry a 10-12% interest rate applied when the loans fall due.
- The Ministry of Agriculture helps to administer the credit. The Kenyan government provides millions of dollars in subsidies targeted at the country's most vulnerable farmers, who receive vouchers that they redeem at agro-dealer shops in exchange for farm inputs. Agro-dealers return the vouchers to Equity Bank, which then credits their accounts, enabling the agro-dealers to purchase supplies.
- Amiran Kenya provides drip irrigation systems, inputs and greenhouses for purchase by farmers. Amiran also accepts government vouchers under the scheme and redeem the voucher for value at Equity Bank.

There are two types of loan:

- Farmers' loans, including input credit and cash advances to enable them to meet urgent financial needs, such as school fees and medical bills, while awaiting payment for their produce.
- Small business loans that target agro-dealers, agro-processors, importers and input manufacturers to finance working capital and imports as well as cover operational needs.

To mitigate the high risks of farming, the plan includes insurance products designed to offset risks such as adverse weather and disease.

Such initiatives can break a vicious cycle in which the high prices of improved seed, fertilizer and other inputs prevent farmers from incorporating improved technologies to boost their yields. Low yields and incomes prevent farmers from accumulating assets that can serve as collateral.

To participate in the programme, a farmer needs to register and fill out the loan application forms in designated agro-dealer shops. The applicant needs to be guaranteed by members of his/her group. The application forms are forwarded to Equity Banks branches. Upon loan approval, the farmer will approach the designated agro-dealer and sign an invoice and a receipt for agricultural inputs received/issued. The agro-dealer then presents an invoice and receipt to Equity Bank for payment, which comes out of the farmer's loan. The loan is given in terms of inputs (in-kind).

Source: AGRA Website; Interviews with Equity Bank on date 4/8/2011.

Box 10

K-Rep Bank market-based micro-finance with output-based aid

The K-Rep bank in partnership with the Ministry of Water and Irrigation (MoWI), Water Services Trust Fund (WSTF), Water Services Boards (WSB), World Bank's Water and Sanitation Programme in Africa (WSP-AF) and a global partnership on output based aid have pioneered micro-finance for small-piped water systems in Kenya. The partnership provides alternative financing mechanisms for the water sector with the aim of supporting community managed rural and peri-urban water supplies. The focus is on rehabilitation and augmentation of existing water supplies and development of new/ Greenfield water supplies. The outputs are increased numbers of standard water kiosks or household connections and water consumption and revenue collection.

Partnerships in the model bring with them synergistic strengths:

- K-Rep Bank-Primary credit risk assessor and project risk underwriter. This provides a market-based loan facility to community groups at agreed upon interest rate; provides 80% of sub-project cost (for each community sub-project which qualifies for a loan). The loans are given at market interest rates for an agreed duration (in the 2005- 2007 pilot, an average payback period was 5 years at 16% interest rate).
- Global Partnership on Output Based Aid (GPOBA)-gives subsidy to projects, covering up to 40% of eligible sub-project cost (i.e. for each sub-project); In this model, the subsidy, which is a grant, can also be sourced from other development partners. The subsidy is used to pay for project costs and accrued interest upon realisation of target outputs; and to cater for project management and administration (audit consultancy and implementation consultancy)
- Community contribution: 20% of sub-project costs
- Athi Water Services Board (AWSB): Government partner and service quality regulator and technical support; carries out sensitisation and mobilisation
- The World Bank's Water and Sanitation Programme in Africa (WSP-AF) provides technical advisory services

Each sub-project is eligible for a loan of up to KSh 10 million targeting a community with an average population of 500 households (2500 persons). This is market-based loan attracting market interest rates. Communities are sensitised about the existence of the micro-finance scheme and its requirements by Athi Water Services Board (AWSB). The communities are encouraged to register as a society, public trust and/or company and submit required documents to Athi Water Services Board for shortlisting and appraisal so that they can meet eligibility for a project development grant. When shortlisted, a detailed feasibility/appraisal is carried out by the support organisation and a project proposal and loan application is made to K-Rep Bank. K-Rep Bank then engages a project audit consultant to undertake project audit and establish output baselines (appraisal of loan application). When approved, implementation of the project is done by the community supported by the project implementation consultant engaged by the Community Water Project (CWP). Outputs of the project are verified by the project audit consultant before the subsidy is released. In the post-implementation period, Business Development Services (BDS) of K-Rep Bank will support project operations and strategic planning.

The model is being upscaled nationally to finance 55 sub-projects (2009-2011) with K-Rep Bank committing US\$ 4 million for loans, EU US\$ 1.5 million as subsidies and Public Private Infrastructure Advisory Facility (PPIAF) committing US\$ 523,000 as community project/proposal development facility.

Source: K-Rep Bank Ltd: Kenya Microfinance to small piped water supplies:
www.wsp.org/wsp/sites/wsp.org/files/pa_5_kenya_dpdp.pdf

Box 11*Rural outreach of financial innovations and technologies*

The programme for rural outreach of financial innovations and technologies (PROFIT, 2010-2016) was launched on 14th June 2011. The objectives of the programme are to increase incomes of the target group as a result of improved production, productivity and marketing in the various rural enterprise sectors. PROFIT encourages the development of a range of innovative financial products, such as savings and remittance services, community infrastructure loans, value chain financing, medium-term financing for the agriculture sector, micro-venture capital modalities, index-based insurance, health insurance, and the cutting edge biometric point of sale devices as applied by Jamii Bora (a registered non-profit trust in Kenya).

PROFIT is implemented throughout Kenya's rural areas, in particular in arid and semi-arid lands and areas with agricultural potential and a high incidence of poverty. The programme will reach out to smallholder farmers, pastoralists, artisanal fishers, women, landless labourers and young people.

The programme has three components, namely (i) rural finance outreach and innovation, (ii) technical support services and (iii) project management. The rural finance outreach and innovation component has a risk-sharing facility leveraging commercial loans given by banks thus facilitating commercial banks to lend to the agricultural sector. It also has a credit facility for deposit taking Micro-Finance Institutions that need immediate access to funds for expansion of their rural and agricultural portfolios. The innovation facility helps to pilot-test innovations and the use of technology in the financial sector. The technical support services has two sub-components (i) the business support service facility targeting rural/village groups with limited business experience and strengthening the governance and management of SACCOs; and (ii) the financial graduation facility that facilitates the vulnerable women and youth to acquire financial graduation through skills training and asset creation.

Key partners to the programme include the Kenya Government (Ministry of Finance/the Treasury), USAID, IFAD, Alliance for a Green Revolution in Africa (AGRA), BRAC Development Institute (BDI) and Consultative Group to Assist the Poor (CGAP). Other Players are the commercial banks from which funds will be leveraged, The Deposit Taking Microfinance Institutions (DTMIs), The Innovation Facility Manager (IFM), Technical Service Providers and Auditors. The programme Management Unit (PMU) is based in the Office of the Deputy Prime Minister and Ministry of Finance, Nairobi. Funding sources for PROFIT are:

Total programme costs: US\$ 83.2 million

- Approved IFAD loan : US\$ 29.3 million
- Approved IFAD grant : US\$ 600,000
- Co-financing: Alliance for a Green Revolution in Africa (US\$ 2.8 million)
- Contribution of borrower (GoK) : US\$ 0.56 million
- Directly benefiting: 196,000 households

The Risk-sharing Facility (RSF) will be managed by Alliance for a Green Revolution in Africa (AGRA) who will provide technical assistance and mentorship support to participating banks and will oversee and supervise the structuring of each risk-sharing arrangement. The Credit Facility (CF) will be managed by the micro-finance unit (MFU)-Department of Economic Affairs (Ministry of Finance) and target Deposit Taking Microfinance Organisations. The Innovation Facility shall be managed by an Innovation Facility Manager (IFM) and the Facility shall be accessed by other implementing partners of the Programme, such as DTMs, Microfinance Institutions, Technical Service Providers, etc., through proposals and arrangements that will be determined by the chosen agency.

The Business Services will be managed through Technical Service Providers (TSPs), who will work directly with producer groups and market intermediaries; and facilitate producer groups and market intermediaries to link with commercial banks and deposit taking micro-financial institutions for provision of rural finance. SACCOs will also receive technical support services and or access to loans when approved by AGRA.

Source: <http://profitruralkenya.org/index.php/rural-finance>

c) Other models: Agri-business Value Chain Development and Market Linkages

The agri-business value chain development and market linkages described here (2SCALE and Commercial Village Model) are clustered around elected commodities, which are dedicated to food security and income generation. Major elements of the 2SCALE approach include (see Text Box 12):

- Development of competitive strategies at the enterprise level (including farm, processing enterprises, input dealers);
- Analysis of comparative and competitive advantages at the regional level by using Porter's diamond of competitiveness and the concept of industry clusters;
- Organisational strengthening/Institutional Development: when markets are "thin" and poorly developed, the focus needs to be on innovative institutional arrangements to improve coordination among all actors along the commodity chain;
- Communication for innovation: facilitation of "experiential" and social learning, networking and lobbying;
- Targeting to build public and private sector partnerships in agricultural and agribusiness development.

The 2SCALE project plans to work in parts of the Upper Tana catchment, especially the lower reaches to promote production of commodities linked to the market chain and is very interested to collaborate with GWC in shared sites. This initiative is very relevant as the target group is a large group of small farmers in the Upper Tana catchment and because the value chain approach offers a complementary approach that is very relevant for the desired development of a commercial investment package that combines both production and soil and water conservation goals. 2011 is being used as a bridge year to plan and prepare the 2SCALE programme for 2012-2016.

The Commercial Village Model, developed and promoted by Farm Concern International, aims at building pro-poor market development initiatives and commercialisation of poor households for enhanced community empowerment. The commercial village model is a trading block comprising producer groups linked to the market and facilitated to have market access financing (see Text Box 13). Key characteristics of this model include:

- Working with producer groups organised into a commercial village;
- Producer groups growing crops requested by the market (market-driven approach); linkages are made to specific markets;
- Using a two-prong approach involving commercialisation systems and market development, which invest heavily in information dissemination. Commercialisation entails issues of consistency (timeliness); quality management; maintenance of standards and a focus on fresh markets and collective action while the focus on markets development is on linkages to supermarkets and informal markets;
- Working in partnerships to provide services to the producer groups in a commercial village set-up e.g. input suppliers, government and civil society organisations, the private sector etc.;
- Facilitation of market access financing through transport discounting, invoice discounting at market, commercial village banking (through mandatory savings as percentage of sales; and credit scheme) and linkages with input suppliers;
- Price setting is done between the producers and buyers.

Farm Concern also works in parts of Upper Tana, currently in the Meru County and envisages collaborating with GWC in shared sites.

Box 12

The 2SCALE Project

The International Fertilizer Development Centre (IFDC) is implementing the 2SCALE Project, which previously has been indicated as “Accelerating Agribusiness in Africa (AAA)” but the name has since changed as the project document continues to be developed further.

2SCALE - Towards Strategic Clusters in Agribusiness thro’ Learning and Entrepreneurship - Ethiopia, Kenya, Uganda, Mozambique

Objective:

To improve rural livelihoods and food security in Sub-Saharan Africa, through the development of competitive rural agricultural systems and viable agro-enterprises, based on sustainable intensification of agricultural production and commodity chain development.

- 2SCALE will focus on increasing food security by stimulating sustainable production, creating more efficient markets, improving income security and better access to healthy food.
- 2SCALE will use a proven concept - the CASE approach - to integrate smallholders in local, national, regional and global value chains. Additional attention will be put on best agricultural practices to increase agricultural productivity and resource use efficiency, including water use efficiency.
- 2SCALE will use profitable local, national and regional commodity markets as key-drivers in agribusiness cluster development, while strengthening producer organisations to respond to these markets and to increase their profitability.
- Private industries can provide a large and sustainable demand that can potentially be met by smallholders. 2SCALE will develop Public Private Partnerships and collaborate with industry partners to develop large scale agribusiness clusters. These Public Private Partnerships will provide financial services to facilitate sustainable agri-cluster development.
- 2SCALE will assist agro-food companies to develop Base of the Pyramid strategies for sourcing commodities produced by African smallholder farmers; 2SCALE will assist companies to target Base of the Pyramid consumers in Africa.
- 2SCALE aims to accelerate development of rural entrepreneurship to drive innovation and agri-business cluster development, through training of “agri-business coaches” and strengthening entrepreneurial capacities of cluster actors.
- 2SCALE will collaborate with regional economic communities to stimulate local and regional markets and promote international market access and trade for agricultural inputs and products, and to “mainstream” the 2SCALE approach.

CASE _ Competitive Agricultural Systems and Enterprises

The framework comprises pillars, concepts and values.

The CASE pillars are:

- Agri-business cluster formation;
- Value chain development and;
- Strengthening of transactional governance capacities.

The basic CASE concepts:

- Competition; and
- Coordination.

The CASE core values:

- Ownership;
- Empowerment; and
- Sustainability.

CASE facilitators essentially support cluster formation and value chain development through participatory research action, extension and networking services.

Source: Interview with IFDC, 3/08/2011

Box 13

Commercial Village Model: Graduating bottom of the pyramid into supply chain players

- Farm Concern International (FCI) is an Africa-wide market development agency, which promotes pro-poor marketing models and strategic alliances to enhance economic growth among poor communities in various countries in Sub-Saharan Africa (SSA). FCI has designed and tested market innovation landscapes that seek to address market barriers in Africa. In developing and implementing market oriented programmes across SSA, FCI's market development initiatives have been benchmarked along private sector market development approaches with the aim of enhancing the competitiveness of the poor in the market place. The FCI pro-poor business models have enhanced sustainability and profitability of farming enterprises in Africa. FCI is currently supporting the commercialisation and market access to millions of smallholders in Sub-Saharan Africa. It is operating in 10 countries in SSA.
- The mission of FCI is "To build pro-poor market development initiatives and commercialisation of poor households in Sub-Saharan Africa for enhanced community empowerment". Its vision is "Commercialised African households with increased incomes and better livelihoods".
- In Kenya FCI deals with producers in Central Province (Nyeri, Murang'a, Karatina, Kirinyaga, and Thika); Western Province (Kakamega); Nyanza Province (Kisii); Eastern Province (Embu, Meru, Makueni, Mbeere) Coast Province (Mombasa, Kilifi, Malindi, Taita).
- FCI works in partnerships with:
 - Government through various Ministries
 - Non-Governmental Organisations
 - Value chain players
 - Community Based Organisations
 - Research Organisations (National and International)
 - Private sector companies (input and output market players) - that is input companies, processing companies, distribution, wholesaling & retailing companies, consumer markets etc.
 - Associations (agro-marketing).
- Collective marketing is done through a commercial village model. In this model households form producer groups clustered according to proximity to markets. Many producer groups in a given village form a "commercial village" (200-500 households), which is a trading block. In a commercial village, there are various committees based on critical functions such as natural resource management. Village elders sit in the committee. The groups work closely with local administration chiefs etc. FCI builds capacity of the village committees. The commercial villages are facilitated to have market access financing. This is done by triggering commercialisation through inputs in-kind for commercial villages, transport invoice discounting, invoice discounting at market level and commercial village banking (through mandatory savings as percentage of sales; and credit scheme). The producer groups are linked with input suppliers and Farm Concern initially shares the costs of inputs with farmers. FCI also links the producer groups in a village to the markets (traders, processors and other market segments) through "a guarantee supply and quality system". Farm Concern International also organises business forums between farmers and traders. During these fora the prices of commodities are agreed upon.
- Three pillars form the foundation that assures the stability of commercial villages:
 - Villages dedicate a percentage of land to be developed for commercial crops. This approach has two levels to cater for land jointly owned by communities and for villages with clear individual land ownership policies.
 - Commercialisation is driven by a market-led approach (find out what the consumer/buyers want and respond to their needs) as opposed to production-oriented approach (produce a surplus of what one grows and then locate markets in which to sell it).
 - Equity across households and gender considerations.
- Challenges:
 - Adoption level by the farmers may take some time. This calls for intensive mobilisation
 - Weather conditions may lead to crop failure
 - Getting farmers to meet quality standards
 - Pricing and seasonality.
- Potential collaboration with GWC
 - Partnership in aspects related to farmer production and marketing
 - Encouraging farmers to grow crops that would give them a good return.

Source: Interview with Farm Concern International, 4/08/2011

3.2.2 Views on investments and financial arrangements

Respondents in this study had varying opinions on what form the investment support on soil and water conservation should take, but the majority agreed that smallholders would need a form of investment support to implement (kick-start) and continue implementing soil and water conservation measures, and/or maintain them in a sustainable manner. This is due to investments required in the form of labour and other inputs, some of which have a cash component.

Kenya has had a long history of implementing soil and water conservation activities since the advent of National Soil Conservation Programme (NSCP) in 1974 (Sida supported) and over the years have tried different approaches, some with success, while others did not live beyond the programme's life span (see Box 2). Indirect incentives in the form of sensitisation and awareness creation, training, technical assistance and extension services still continue to be valuable in supporting long-term implementation of soil and water conservation practices. Direct short-term incentives linked to soil and water conservation activities while indirectly targeting livelihood and asset improvement and recovery (after disasters) have also been used in Kenya: cash-for-work, food-for-work and food-for-assets implemented using various designs including specified voucher system. The direct short-term incentive afore-mentioned has rarely outlived the lifespan of the intervention since most of these interventions were never designed with "sustainability" in mind, but to address immediate farmer needs (e.g. food supply). However, they are based on an important rationale of minimising dependency by not giving "free cash or food" but the grants and subsidies are linked to "specific conservation work done". The direct cash payments to individual households as an incentive for implementing soil and water conservation has also had its pitfalls in Kenya with such payments being diverted to non-conservation activities and thus not invested in sustaining conservation efforts.

From Kenya's history of conservation, the following lessons, among others, bear relevance to this study:

- (i) Grants/subsidies given to farmers as rewards/incentives need to be linked to "measurable" conservation activities to avoid being perceived as being a free gift or free cash for which no one is held accountable.
- (ii) Sensitisation, training and extension services on SWC are a necessary pre-requisite for success, but not sufficient enough for smallholders to continue with conservation work in a sustainable manner. This indirect incentive needs to be backed up by an investment support that enables farmers to:
 - Access inputs required for conservation activities in a sustainable manner. Provision of tools and other incentives to catchment committees and soil conservation groups during the Sida-supported conservation work in Kenya showed that these groups and committees became inactive, partly upon the withdrawal of the incentives and/ or when the programme no longer provided tools for conservation.
 - Bridge gaps in their livelihoods when waiting for the benefits of structural measures of conservation to be realised in the long term. Implementation of structural measures of conservation needs to go alongside short-term interventions for addressing smallholders livelihoods (e.g. production of high value crops on terraces) for farmers to appreciate the benefits of conservation.

Opinions of institutional respondents interviewed in this study were mixed with some preferring the use of grants, others credits and yet others a mix of the two to facilitate farmers' investment in soil and water conservation practices. However, an analysis of existing investment models related to natural resource management in the agricultural sector (Boxes 1-13) appear to indicate that the use of a mixture of grants and credit is feasible when the objectives of the investments are clearly spelt out. This is in concurrence with some of the respondent's perceptions that farmers will be slow to respond to credit systems directly tied to soil and water conservation activities, whose benefits will only be realised in the long term; and thus paying back such loans would be a challenge unless a targeted product that meets smallholders' needs is designed to enable them service such loans. Kenya's smallholder environment has little experience with commercial loans and or

soft loans directly targeting soil and water conservation activities. This study therefore proposes the use of a mixture of grants and suitable credit facility with the following elements:

- (i) *Grants*: The grants can be used for capacity building (sensitisation, farmer training etc) and coordination and management of activities. The grants can also be used to enhance farmers' access to regular inputs required for production and conservation activities through a voucher system (planting materials and tools for soil and water conservation) redeemable at designated stores. Setting up a risk-sharing and guarantee mechanism would also require the use of grants.
- (ii) *Credit Facility*: Due to the prevailing banking perception that lending to smallholders and agro-businesses is "high risk" and the historical reluctance of banks to gamble on potentially "unacceptable" losses, it seems unlikely that loan facilities, such as those offered through Kilimo Biashara, K-Rep and those envisaged under PROFIT (Boxes 8-10), would have come into existence were it not for the risk-sharing and guarantee funds that the partnership provides. The study therefore proposes the following:
 - Promotion of conservation linked to income generation and or livelihood based activities that bridge farmers' income needs and enhances their capacity to service credit in an arrangement where credit facility is indirectly or directly offered for conservation-linked activities. Possible areas of conservation-linked activities include production of high value crops on terraces or in conserved land (vegetables, fodder, drought escaping crops etc.), bee keeping in riverine areas, raising tree seedlings for sale etc. Market linkages through a value chain approach should be integrated. The value chain approach is promising as it primarily looks to market demand for specified commodities, for which it finally requires a large group of farmers to produce for the market in or outside Kenya. This is in particular valuable for the smallholders who do not have good income generation crops such as those in the lower and drier areas of the Upper Tana catchment. The 2scale project is identifying marketable commodities suited to this area.
 - Participation of a financial institution that can administer credit to farmers for inputs required for income generating enterprises-linked to conservation activities. This Credit Facility needs to take into account (i) risk-sharing mechanisms and guarantee funds that would cater for risks that banks would incur in the eventuality that smallholders default or production is negatively affected by weather; (ii) an initial investment fund set up by the financial institution that will be "multiplied" over time; (iii) issuance of input loans in-kind for target enterprises linked to conservation activities through linkages with input suppliers/traders e.g. agrovets; (iv) issuance of loans at negotiated interest rates (soft loans) and pay-back period; and (v) designing credit facility for targeted smallholders in the Upper Tana but also specific products for the lower semi-arid regions where there are high incidences of crop failure and a comparatively lower capacity to service loans.
- (iii) *Farmer contribution*: The model should integrate a farmer contribution. Farmers' "own" labour and tools and equipment should be considered as part of an in-kind contribution.

3.2.3 Perspectives on institutional arrangements

Institutions are the "rules" in any kind of social structure, i.e. the laws, regulations and their enforcement, agreements and procedures while organisations are a particular type of institution and are composed of groups of people with a common objective. Institutional arrangements are therefore policies, systems, and processes that organisations use to legislate, plan and manage their activities efficiently and to effectively coordinate with others in order to fulfil their mandate. Organisations that have a potential role to play in Green Water Credits have been described by Muchena and Onduru (2011). These institutions include Government bodies, civil society organisations (Faith Based, Non-Governmental Organisations, Community Based Organisations etc.) and the private sector.

Preferences for most respondents in this study indicate a Government body taking lead in the implementation of Green Water Credits, but working with other players (stakeholders) with different strengths in the sector

(see Chapter 3.1). This proposed arrangement includes a lead agency or facilitating and coordinating body (farmers' preference is that this would be a government body) working in formalised partnership with service providers (stakeholders) and community groups. Characteristics of this arrangement include:

(i) Facilitating/coordinating body: The GWC envisages implementation based on a river basin. Thus, Water Resources Management Authority (WRMA), a state cooperation under the Ministry of Water and Irrigation (MoWI) charged with management of water resources countrywide at basin-level is a preferred option in playing the facilitation and coordination role. At sub-catchment level, the Water Users Associations (WRUAs) are the operational arm of the WRMA regional offices, for example in the Upper Tana catchment, the WRMA-Embu Regional Office oversees 114 WRUAs (46 have registered with the Registrar of Societies and completed the development of sub-catchment management plans); and the number is set to increase to 200.

(ii) Technical service provision: Technical service providers relevant from GWC are drawn both from public and private sector stakeholders as indicated by farmers' preferences in Section 3.1 of this report and institutional survey (Muchena and Onduru 2011). Public organisations may include the following:

- Ministry of Agriculture - has the mandate to provide extension services and legal backing on providing services on soil and water conservation [The 1965 Agriculture Act CAP 318, The Agriculture (Basic land usage Rules), 1965]
- Ministry of Livestock Development - provides extension services on livestock production, including fodder production (partly grown on terraces as well) and rangelands. The Ministry of Livestock Development and the Ministry of Agriculture are spearheading NALEP.
- Ministry of Water and Irrigation
- WRMA-charged with management of all water resources including catchment protection (riverine areas); the WRUAs, have an overall coordinating role by developing sub-catchment water management plans that include catchment protection, soil and water conservation, and correct management of riverine areas and assist/guide the community groups in each sub-catchment to adequate technical support entities operating in the sub-catchment.
- Kenya Forestry Service - Ministry of Forestry and Wildlife – these deal with tree nurseries and catchment protection
- Ministry of Roads - responsible for road runoff control etc.

Service providers from the private sector with potential to provide services under the GWC includes NGOs and Faith Based Organisations, and all other institutions that have mandates related to natural resource management-KenGen, Nairobi Water, IFDC - 2Scale among others; see GWC Report No.16.

(iii) Financial service provision: Based on interviews conducted in the Upper Tana, it is envisaged that investment/financial service provision may have two components:

a) Enhancing access to specified inputs directly linked to conservation activities

This will involve a specified voucher system that will enhance smallholder community groups access to specified inputs for direct conservation activities (establishment and maintenance of conservation structures) e.g. for tools and equipment and other specified conservation materials.

b) Credit facility for income generation linked to conservation activities

Credit lending institutions (e.g. Equity Bank) would be useful in setting up a Credit Facility (with a risk-sharing/guarantee system) focusing on income generation for smallholders but on enterprises that are linked to conservation activities. A financial service provider (Equity Bank) can enter into contracts with community groups through agreed upon system of offering credit facility for inputs that farmers require for income generating enterprises linked to conservation. A system to enable farmers access to such inputs can be worked out during the project design stage including procedures for determining eligibility of community

groups, organisations or stakeholder fora that will appraise the groups (intermediaries) and recommend to Equity Bank, Equity Bank appraisal mechanisms, agrovets that will supply the inputs in kind (voucher system?) etc.

(iv) Risk-sharing and guarantee institution: A guarantee institution would be needed to establish a fund as a risk-sharing mechanism to leverage banks and micro-financial institutions against possibilities of loan default and or for creating suitable “soft loan” schemes for smallholders. A risk grant (or possibly a loan) of US\$ 10 Million from IFAD is proposed.

Besides risk-sharing guarantee, there is need for “technical guarantee” that implementation has taken place when redeemable vouchers are given to farmers to access inputs required for conservation purposes. This can be done by a high level-Stakeholder Forum and at farm level- through groups (e.g. Focal Area Development Committees), See Figure 1 (proposal 1).

(v) Client organisations (community groups): Working through community groups would bring in efficiency into the investment mechanism as groups can have a self-monitoring and guarantee system; and when such groups grow high value crops on conserved land, they can sell as a group and or bargain for prices. Community groups in this category include self-help groups involved in conservation activities, youth groups, and common interest groups and Focal Area Development Committees (under NALEP) among others (see Muchena and Onduru (2011)). The Water Resource Users Associations are envisaged to have a coordinating, initiating, assisting and monitoring role for the community groups in each sub-catchment (see Figure 4).

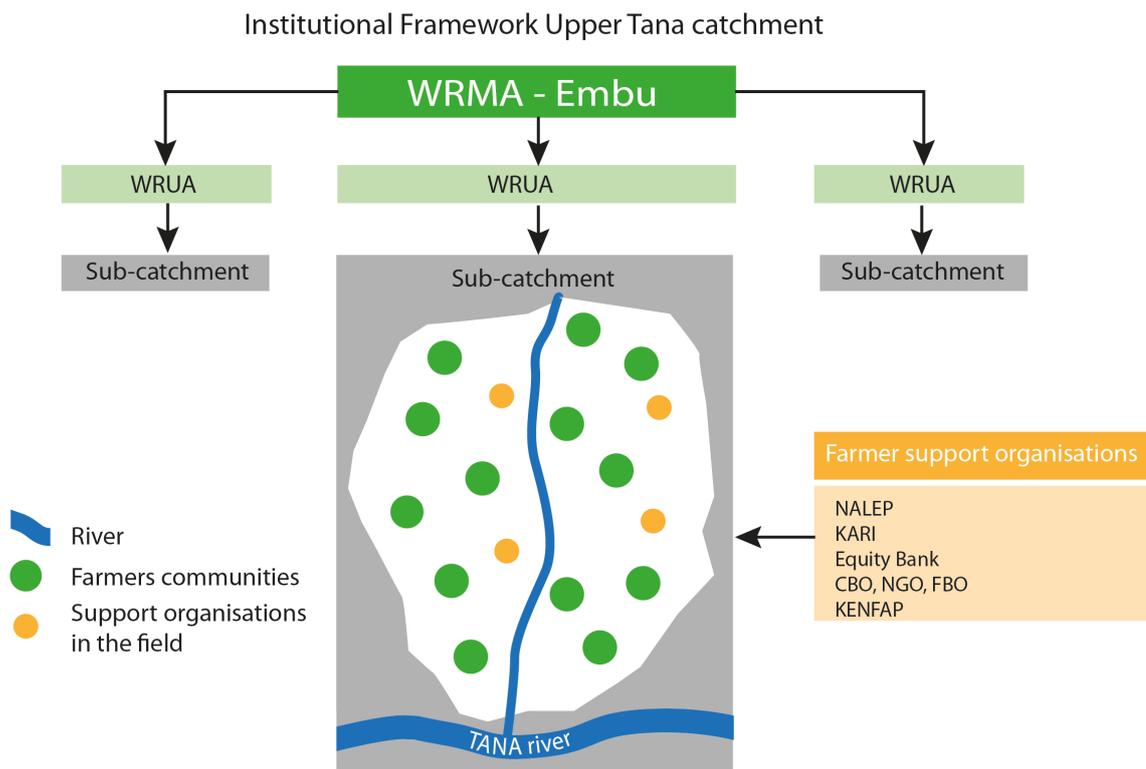
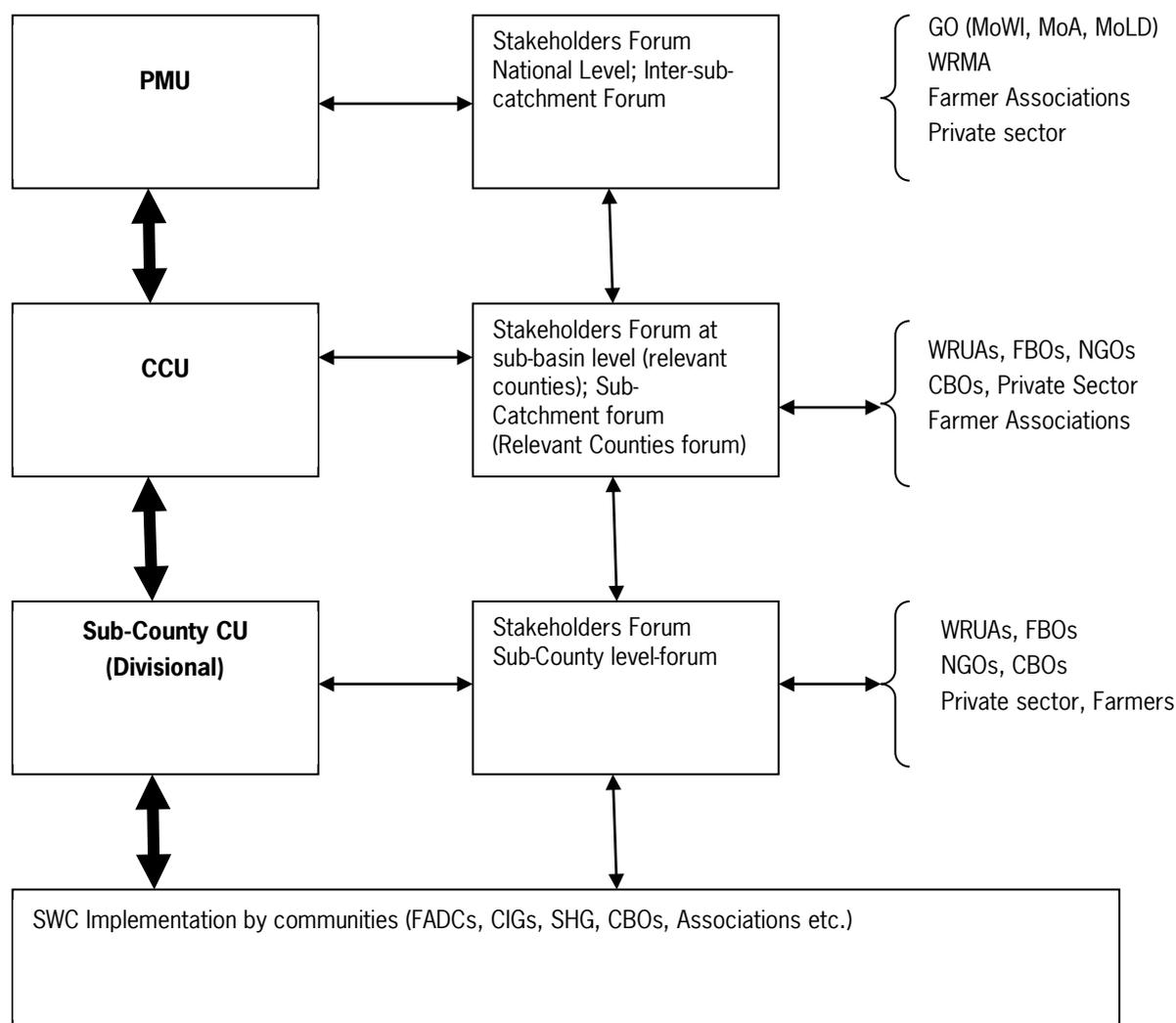


Figure 4
Institutional framework in Upper Tana catchment - proposal 1

(vi) Monitoring system: A monitoring system involving the stakeholders (all institutions involved in implementation) would be key in keeping track on performance and implementation of the GWC. Monitoring can be done at various levels (i) technical field operational level (*green water* monitoring) (ii) at basin level (*blue water* monitoring; and at (iii) contractual level (bank operations and contract performance). Stakeholders with relevant expertise and the roles that they can play are described in Muchena and Onduru (2011). For example, the Ministry of Agriculture and other organisations (NGOs, FBOs) can monitor implementation SWC on rainfed agricultural land while WRMA-Regional Office in Embu can monitor implementation at river, lakes and groundwater (*blue water*) levels etc. However, it is envisaged that the Credit Facility can be internally monitored by the Bank itself in collaboration with organisations offering technical services and community groups.

Based on responses received from various stakeholders, this study proposes a second arrangement for further discussion (Figure 5). In this second proposal the implementation of GWC in the Upper Tana is envisaged to be guided by a Programme Management Unit (PMU) at the Tana basin level, potentially the TaNRMP PMU falling under the WRMA and having dedicated specified ties with Ministry of Water and Irrigation and the Ministry of Agriculture and Coordination Units at sub-catchment (e.g. strengthened WRUAs), that should also fit the sub-county level. The respective WRUAs should integrate, or at least directly work together with the NALEP initiated Stakeholder Forums (Figure 5), with each group assigned specific responsibilities.



Key:

- | | |
|--|---|
| PMU- Project Management Unit | MoLD- Ministry of Livestock Development |
| CCU- County Coordination Unit | MoWI- Ministry of Water and Irrigation |
| WRMA- Water Resources Management Authority | SWC- Soil and Water Conservation |
| FBO- Faith Based Organisation | FADC- Focal Area Development Committee |
| CBO- Community Based Organisation | CIG- Common Interest Group |
| GO- Government organisation | NGO- Non-Governmental Organisation |
| WRUA-Water Resource Users Association | MoA-Ministry of Agriculture |
| SHG-Self Help Group | CBO-Community Based Organisation |

Figure 5
Proposed institutional arrangements for implementation of GWC - Proposal 2

3.3 Perspectives for potential sources of funding

Private stakeholders are interested and ready to contribute to upstream catchment protection, thus soil and water conservation. However, they do not see a system that delivers at the necessary catchment protection a large enough scale occurring for years to come. Potential sources of funding for GWC include those that can be raised domestically (national sources) in Kenya and complementary ones that can be raised internationally,

the latter in particular to kick-start the process, i.e. to bridge the investment gap between the costs to be made and the delay in benefits accruing.

3.3.1 National potential sources of funding

Potential national sources of funding include

(i) Farmer local contribution

This study has shown that farmers are willing to contribute in kind for *green water* management activities that include all SWC practices beneficial for local and downstream water users. The farmers' contribution would be partly in the form of labour, and partly through tools and equipment. Information collated in **Section 3.2** has shown that most projects that involve farmer groups have integrated farmer contribution as part of funding for activities. These contributions range from 10-30% of total costs of activities to be implemented by specific community groups. Farmer contribution (in-kind) of up to 20% is envisaged to be feasible in the GWC, though this level of contribution must be further verified by the project design team.

(ii) Water Resources Management Authority water fee

The Water Resources Management Authority (WRMA) charges water fees to various water users. The legal backing is in the Water Act, 2002 that established WRMA and the Water Services Trust Fund (WSTF) and other Water sector institutions e.g. Water Services Board. Fees charged to water users is based on assessment of the status of water resources and the risk posed to water users/volume abstracted. Charges are KSh 0.5 per m³. However, above 300 m³, a different fee is levied depending on category of abstraction in question:

Category A: Low impact; a letter/permit is given to allow for use

Category B: Impact can be controlled

Category C: Requires further scrutiny before permit is issued

Category D: Involves water transfers from one catchment to another, for example Tana catchment to Athi catchment

About 50% of fees collected is transferred to WRMA Headquarters while 25% of the remaining fees is used for catchment conservation and a further 25% for administrative purposes at WRMA regional office level. The water collection fees allocated for catchment conservation is channelled through Water Services Trust Fund (WSTF) and disbursed to WRUAs upon approval of application from the respective WRUAs following due process of Water Resource Users Association Development Cycle (WDC). This window of funding is open to WRUAs only which also contributes 15-25% of total costs in kind, which fits well with the proposed farmers' own contributions as verified in our interviews.

Under Legal Notice 171 of September 28, 2007 of the Kenya Gazette, large users of water are required to pay KSh 0.5 per cubic metre of water they extract from lakes, rivers or underground sources: these include KenGen, the National Irrigation Board (NIB), the Water Services Board etc. It is estimated that about KSh 350 million can be collected annually if all water users pay water fees².

² The East African Standard Published on 10/03/2011: State firms warned over Sh1b water bill; <http://www.standardmedia.co.ke/news/InsidePage.php?id=2000030921&cid=159&>

(iii) Water Services Trust Fund

The Water Services Trust Fund (WSTF) is a state corporation established under the Water Act, 2002 with a mandate to “assist in financing the provision of water services to areas in Kenya which are without water services”. The WSTF operates the following funding windows:

- The Community Project Cycle (CPC) for rural water and sanitation projects;
- The Urban Project Cycle (UPC) for urban water and sanitation projects; and
- Water Resources Users Association (WRUAs).

A micro-financing system, Output Based Aid (OBA) has also been developed.

Water Services Trust Fund provides grants to WRUAs which have met specified conditions for implementation of activities eligible for WDC funding such as conservation and rehabilitation of catchment and riparian areas, strengthening WRUA management systems etc. Grant levels and conditions are presented in Box 3.

(iv) Downstream fees paid by large water users

The large water users, which pay fees that can be used for conservation include:

a) KenGen

KenGen has an interest in catchment conservation because the rivers are vital sources of water for hydropower generation and it would like to see a reduced sediment load in the rivers, less siltation in dams and longer economic lives for power plants. Conservation efforts include social afforestation, lower catchment conservation close to power installations, and conservation of major catchment areas (e.g. Aberdares) and private tree nurseries (e.g. in Kipipiri). KenGen has carried out a review on soil and water conservation in the Upper Tana and has done a study that designed a livelihoods programme linked to improved natural resource management.

KenGen has an agreement with the Government of Kenya to pay fees to Regional Development Authorities (RDA), Tana Athi River Development Authority (TARDA) and Kerio Valley Development Authority (KVDA). KenGen acquired multipurpose water dams from the Regional Development Authorities (June 1999). Part of this support is used for conservation activities by the Regional Authorities; For example, it is estimated that KVDA gets KSh 45 million for the Upper Turkwel catchment conservation and dam monitoring annually from KenGen³.

KenGen is supposed to pay fees to WRMA for catchment protection. However, this has been impeded by legal, institutional and technical challenges (Box 14).

KenGen is also involved in the Kenya Energy sector Environmental Programme (KEEP) that brings together the Ministry of Energy and State Corporations in the energy sector to carry out conservation: these include the Kenya Electricity Generating Company (KenGen), the Kenya Power and Lighting Company (KPLC), the Kenya Pipeline Company (KPC), the National Oil Corporation of Kenya (NOCK), the Kenya Petroleum and Refinery Limited (KPRL) and the Energy Regulatory Commission (ERC). KEEP’s action plan launched in 2008 focuses on:

- Energy efficiency and conservation;
- Tree planting for wood fuel, commercial purposes and conservation;
- Watershed management in the five water towers namely the Aberdares, Mt Kenya, Mau Escarpment, Mt. Elgon and the Cherangani Hills;
- Training;
- Publicity and awareness.

³ www.kvda.go.ke/energy.html

KEEP is a nationwide programme and will spread to all constituencies. Special attention is paid to water catchments areas (“water towers”). Details on funds available in particular to invest in soil and water conservation need further investigation, e.g. in the current TaNRMP design.

Box 14

Kenya Electricity Generating Company Limited

KENYA ELECTRICITY GENERATING COMPANY (KenGen) Limited is the leading electric power generating company in Kenya, producing about 80% of electricity generated. The company utilises various sources to generate electricity ranging from hydro, geothermal, thermal and wind. Hydro is the leading source, with an installed capacity of 766.88 MW, representing 64.9% of the companies installed capacity. KenGen sells power in bulk to Kenya Power (Formerly Kenya Power and Lighting Company) which transmits, distributes and retails electric power to various categories of consumers throughout the country.

KenGen is currently operating in a liberalised market; and there are four independent power producers who generate about 20% of the country's electric power.

KenGen has a corporate environmental policy statement which commits the company to long-term environmentally sustainable development that is consistent with the national and international standards in the generation of safe and reliable electric energy. However, the company is not directly involved in long-term conservation projects (except tree planting) at the smallholder level.

KenGen uses water resources in the Tana river basin for electric power generation; however, the Masinga and Kiambere dams are owned by the Tana and Athi Rivers Development Authority (TARDA) to whom KenGen pays an annual conservation fee. Siltation trends in the dam are supposed to be monitored by TARDA and WRMA. Conservation interventions in the catchment's areas are the mandate of WRMA and TARDA. KenGen is only involved in the operational interventions if something arises on the Masinga and Kiambere dams. KenGen pays an annual conservation levy to TARDA for conservation efforts (and also the Kerio Valley Development Authority for the Turkwell Dam).

KenGen is supposed to pay a levy to the Water Resources Management Authority (WRMA) at a rate of 5 Kenya cents for every KWH generated for using the water resources. Two issues are yet to be negotiated to a conclusion on this levy; should the KWH be the unit to which the payment is pegged considering the investments in technologies that enhance efficiency that the company might make or be based on amount of water used? Since the company's use of the water is not consumptive, should the company be charged for the water only once it passes through Masinga dam or when it passes each dam along the cascade?

The tariff structure for KenGen is regulated by the Energy Regulatory Council and is based on costs. The WRMA levies had not been factored into the tariff structure for KenGen and the company is therefore not yet able to remit any levies to WRMA. If the WRMA tariffs are factored into the cost structure for power, the cost of electric power in Kenya is bound to rise, affecting the economy in general. This is against a background of consistent rising fuel costs and weakening Kenyan currency. Any other initiative projecting on KenGen making a financial contribution should plan with the understanding that the KenGen tariffs are regulated and based on costs.

There are current discussions to develop and table an energy bill that will facilitate KenGen and the institutions linked to the energy sector to become operational under the new constitution of Kenya. There is need to have operations of all the institutions in the energy sector harmonised, especially in the manner that levies are charged and conservation funds utilised, in order to maintain the Kenyan economy's competitive edge as an investment destination in the East African region.

b) Nairobi City Water and Sewerage Company (Nairobi Water)

Nairobi City Water and Sewerage Company (Nairobi Water) sources its water mainly from the Upper Tana catchment and has an interest in catchment conservation. Catchment conservation contributes to improved soil conservation, and thus better water quality in rivers emanating from the catchments from which Nairobi Water abstracts its water. Nairobi Water currently pays water fee to WRMA. The use of water fees by WRMA for conservation has been described in Section 3.3.1 (ii).

c) Irrigators

Irrigators are interested in better regulated water flows. The potential of irrigation land in the Upper Tana is high, however, water resources are unreliable and negative trends prohibit implementing irrigation expansion programmes. Irrigators abstracting water from different rivers in the Upper Tana are paying water fees to WRMA under the Water Act 2002, part of which is used for catchment conservation.

(v) Potential sources from Carbon Credit

The Carbon Credits scheme is a potential source but is not fully developed yet in Kenya. Normally, carbon trade occurs when companies, mostly in the North, pay a fee for every amount of certified carbon dioxide released to the environment (certified emissions reduction, CERs). The money is then used to pay other companies or organizations, which develop projects that facilitate less release of carbon dioxide to the atmosphere. Carbon credit is relevant because improved *green water* management will increase biomass production and soil organic carbon. This carbon sequestration in the soil will build up in time to a huge amount of soil organic matter.

Green Water Credits Phase II has made a calculation for the upper catchment of the potential below-ground carbon sequestration⁴, which results from implementation of SWC at the improved and enlarged scale. Initial calculations over a period of 20 years have demonstrated that a large potential of carbon credits already exists for the Upper Tana catchment alone. The Kenya Government and other interested parties can make a detailed proposal to the international carbon-offset market. The TaNRMP may consider including this as a very relevant component as the calculated conservative amount of **US\$ 7-13 per hectare each year** may offer an attractive reward for the farmer to cover part of the costs for maintaining the soil and water conservation practices; maintenance has been always the Achilles heel of conservation projects in the past (text box 15).

Box 15

Carbon credit potential in the upper Tana

With implementation on some **348,000 ha in the Upper Tana catchment**, the eco-technologically possible Soil Organic Carbon (SOC) gains are estimated at 4.8 to 9.3 x 10⁶ tonnes (Tg= 10¹² g) CO₂ over the next 20 years. Assuming **a conservative price of US\$ 10 per tonne CO₂-equivalent** on the carbon-offset market, this would correspond to some **US\$ 48-93 million over a 20 year period** of sustained soil and water management. This would correspond to a projected potential payment of some **US\$ 7-13 ha⁻¹ to farmers annually**; this amount would be in addition to financial incentives that are being put in place for implementing GWC practices. Higher market prices for CO₂-equivalents than the one assumed here, would probably allow for a more rapid implementation of the proposed agricultural mitigation measures.

Source: Batjes 2011

In Kenya today, KenGen Company earns an estimated KSh 442 million every year from the sale of 660,000 tonnes of carbon credits to the World Bank, the money is invested in generation of geothermal power and the rest used for community development. Others that trade carbon include Mumias Sugar Company, OrPower and Green Belt Movement⁵. A 310 megawatt (MW) Kenyan wind power (Lake Turkana Wind Power) project has also received approval to earn carbon emissions credits under the United Nations' Clean Development Mechanism

⁴ The above-ground carbon sequestration is under investigation by KARI-KSS and ICRAF-PRESA

⁵ Carbon Credit Picks Up in Kenya: www.kenyaengineer.or.ke/index.php/kenyaengineer/article/viewFile/.../252

(CDM) and part of the carbon credit funds will be used for development activities targeting community living around Lake Turkana⁶.

(v) Potential for public funding

Green Water Credits is expected to provide potential public benefits such as regulated river flows, groundwater recharge, and reduced flood risk, reduced risk of hunger in years with below par rainfall and preservation of public infrastructure due to reduced flooding. Thus potentially the GWC can be eligible for public funding.

3.3.2 International sources of funding

IFAD and other international funds for TaNRMP: the new TaNRMP, based on an IFAD loan to the Government of Kenya (GoK) is envisaged to include a GWC Investment Fund for Soil and Water Conservation to the tune of US\$ 10 million: this amount is specifically intended to kick-start the GWC Investment Fund; and can be used as a risk-sharing mechanism loan to leverage the proposed Credit Facility of US\$ 30 million GWC Investment Fund by the Equity Bank.

⁶ Kenyan wind power farm gets carbon credit approval; Article 24th May 2011-
<http://af.reuters.com/article/investingNews/idAFJOE74N0LU20110524>

4 Discussions and over-arching remarks

This study aims to document farmers' preferences with respect to investment in soil and water conservation practices, identifying and describing potential financial mechanisms and perspectives for sources of funding for soil and water conservation activities - and describing potential institutional arrangements for implementation of soil and water conservation activities in the Upper Tana catchment. 129 households were interviewed to capture farmers preferences, in three sub-catchments of the Upper Tana (Tungu, Kayahwe and Lower Chania), where on-site cost benefit analysis study had been carried out. Interviews were also conducted for selected institutions located in Nairobi and in the Upper Tana catchment area to gather information for models of financial mechanisms targeting smallholders in natural resource management, institutional arrangements and potential sources of funding. The following main conclusions emerge from the study:

A - Farmers' preferences regarding investment mechanisms for soil and water conservation

Conclusion 1: Smallholder farmers are able to access locally available inputs for soil and water conservation; however inputs obtained off-farm require purchases. The majority of the households purchase tools and equipment (90%), off-farm planting materials including conservation stabiliser grasses (71%), inorganic fertilizers (91%) and crop protection materials (76%). Labour for conservation is sourced locally (family labour) by the majority (63%).

Conclusion 2: Smallholders preferred technical assistance and investment support for soil and water conservation are in the form of short-term production investments, thus a feasible investment mechanism needs to take cognisance of both short-term and long-term investments required for soil and water conservation activities. The study has shown that smallholders preferred areas of technical assistance includes advice/ extension on soil and water conservation practices (97% of households) and training and demonstration on the same (96%); while areas of investment support are for locally available planting materials (53%), off-farm available planting materials (78%), tools and equipment (73%), inorganic fertilizers (91%), organic fertilizers (70%), crop protection materials (89%) and labour.

Conclusion 3: Smallholders prefer technical support (training and extension) to be given directly by service providers (in the form of grants), but had varying opinions on which form other areas of investment support should take with the majority suggesting the following:

- Enhancing access to off-farm available planting materials (74% of respondents).
- Subsidising inorganic fertilizer prices (56%) and/ or either providing them with credit/low interest loans (15%), making direct cash purchases (16%) or giving them as grants (7%).
- Providing training on organic fertilizers (preparation and use) (62%) and/ or finances for acquiring them (21%) or supporting access to hired labour for their preparation (13%).
- Accessing crop protection materials through subsidies (53%), financial support including loans and grants (17%), low interest loans/credit (15% of households) and enhancing access to crop protection equipment (10%).
- Enhancing access to tools and equipment through rewards/incentive (56%), low interest loans/credit (18%) and other forms of unspecified financial arrangements (19%)
- Supporting access to hired labour

Conclusion 4: Smallholders prefer organisations through which investment support can be channelled varied from one household and one sub-catchment to the other with preferences indicated as follows: government

bodies (43% of households), financial institutions/banks (15%), faith based organisations (14% of) and community based organisations (12%), and savings and credit cooperatives (10%).

Irrespective of their first choice, the majority of the respondents (69%) believed that no single organisation could handle the investment support alone. The majority of respondents (43%) who selected government organisations as their first choice also said that government bodies should not work alone but with financial institutions, faith based organisations, community based organisations, SACCOs and non-governmental organisations.

Conclusion 5: The form of investment support preferred by majority of smallholders (61%) was shared contribution in which the farmers contribute partly in-kind while the Green Water Credits meets other obligations in the form of grants. However, about 39% of the respondents preferred the investment support to be in the form of low interest loans.

B - Investments, institutional arrangements and potential sources of funding

Conclusion 6: Potential financial arrangements Green Water Credits include consideration of grant-based models, credit-based models with risk sharing and or loan guarantee mechanisms and models based on market linkages with or without grants and credit. The study notes that these models can be combined in various shapes and forms to design a sustainable investment mechanism that is self-propelling beyond the pilot implementation phase.

Conclusion 7: The preferred financial arrangement would be a mixture of both grants and credit/loans. The grants would be used for capacity building (training), coordination, monitoring and evaluation, contract management and enhancing farmer's access to inputs for soil and water conservation through, possibly, a voucher system. The credit facility would be used to offer input loans (soft loans) to farmers for income generating enterprises-linked to conservation activities; the Equity Bank has labelled this the "Sustainable Commercial Investment Package.

Conclusion 8: The proposed cooperation between GWC under TaNRMP and 2SCALE offers a relevant joining of international funds, combining the short term production and the long term conservation investments with a value chain approach that will strengthen the income generation needed to sustain conservation practices.

Conclusion 9: It is proposed to have an institutional arrangement involving The Water Resources Management Authority (WRMA) as a lead agency with dedicated ties to the Ministry of Water and Irrigation and Ministry of Agriculture, working with both public (MoA extension services, NALEP and KARI) and civil society technical service providers, a financial service provider capable of reaching one hundred thousands of smallholders, community groups and associations in an arrangement that involves formalised partnerships, designed operational structures – WRUAs and stakeholder fora- with assigned responsibilities at each sub-catchment level.

Conclusion 10: Potential sources of funding identified include farmer contributions, part of water fees charged by WRMA channelled to catchment conservation through Water Services Trust Fund, large water users and international sources such as from IFAD to Tana Natural Resources Management Project. It is recommended to explore the huge potential of carbon credits as results of improved soil and water management, as this has the potential to sustain the required maintenance investments for an indefinite period.

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Annex 1 Household Questionnaire

Cost benefit analysis and institutional arrangements for implementation of soil and water conservation practices

Individual household questionnaire

A: Identification and interview

Household code (A1) *[Leave blank]*

Date of interview (A2)

Date : __ / __ / ____
DD MM YY

Name person(s) interviewed/respondent (A3)

Name enumerator/Interviewer (A4)

Distance to main market (km) (A5)

Location identifiers

To be done by supervisor

Sub-Catchment Name (A6) : _____

Position in the sub-catchment (A7) : _____

District (A8) : _____

Supervisor: _____

Division (A9) : _____

Location (A10) : _____

Sub-Location (A11) : _____ Village:.....

TIME START: _____

TIME STOP: _____

Use: N/A: For not applicable

B: Household head characteristics (Use codes at the bottom to fill table)

Category	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
	Full names	Gender	Age (yrs.)	Marital Status	Main Occupation	Education level (no. of yrs)	Literacy level	Engaged in off-farm activities	Receive remittance

B1:
Household
Head

B2: Spouse

				1. Single	1. Farming family fields		1. Illiterate	1. Yes	1. Yes
	1. Male			2. Married			2. Literate		
	2. Female			3. Widow	2. Off-farm employment-			2. No	2. No
				4. Widower	farming				
				5. Separated					
				6. Divorced	3. Off-farm employment- other				
					4. Attending school				
					5. Housekeeping				

B: FARMERS PREFERENCES FOR INVESTMENT IN SOIL AND WATER CONSERVATION ACTIVITIES

Questions	Responses					
B1. Give your opinion on how your household accesses the following inputs required for establishing SWC structures? [Multiple Response]	1. Labour	<input type="radio"/> 1) Own	<input type="radio"/> 2)Hired/purchased	<input type="radio"/> 3 Gift	<input type="radio"/> 4 Group work	<input type="radio"/> 5 Credit
	<i>Materials</i>					
	2. Locally available planting materials	<input type="radio"/> 1) Own	<input type="radio"/> 2)Hired/purchased	<input type="radio"/> 3 Gift	<input type="radio"/> 4 Group work	<input type="radio"/> 5 Credit
	3. Off-farm available planting materials	<input type="radio"/> 1) Own	<input type="radio"/> 2)Hired/purchased	<input type="radio"/> 3 Gift	<input type="radio"/> 4 Group work	<input type="radio"/> 5 Credit
	4. Inorganic fertilisers	<input type="radio"/> 1) Own	<input type="radio"/> 2)Hired/purchased	<input type="radio"/> 3 Gift	<input type="radio"/> 4 Group work	<input type="radio"/> 5 Credit
	5. Organic fertilisers	<input type="radio"/> 1) Own	<input type="radio"/> 2)Hired/purchased	<input type="radio"/> 3 Gift	<input type="radio"/> 4 Group work	<input type="radio"/> 5 Credit
	6. Crop protection materials	<input type="radio"/> 1) Own	<input type="radio"/> 2)Hired/purchased	<input type="radio"/> 3 Gift	<input type="radio"/> 4 Group work	<input type="radio"/> 5 Credit
7. Tools and equipment	<input type="radio"/> 1) Own	<input type="radio"/> 2)Hired/purchased	<input type="radio"/> 3 Gift	<input type="radio"/> 4 Group work	<input type="radio"/> 5 Credit	
B2. What type of support would your household require to implement soil and water conservation activities?	<i>Area of support needed</i>		Required?		If Yes, What form of support	
	1. Training	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>		
	<u>(ii) _____</u>					
	2. Advice/extension	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>		
	<u>(ii) _____</u>					
	<i>Materials</i>					
	3. Locally available planting materials	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>		
	<u>(ii) _____</u>					
	4. Off-farm available planting materials	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>		
	<u>(ii) _____</u>					
	5. Inorganic fertilisers	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>		
	<u>(ii) _____</u>					
	6. Organic fertilisers	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>		
	<u>(ii) _____</u>					
7. Crop protection materials	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>			
<u>(ii) _____</u>						
8. Tools and equipment	<input type="radio"/> 1) Yes	<input type="radio"/> 2) No	<u>(i) _____</u>			
<u>(ii) _____</u>						
B3. If investment support is required what would be the preferred mode	<i>Organisation</i>			<i>Tick</i>		
	1. Community Based Organisation (CBOs)				<input type="checkbox"/>	
2. Faith Based Organisation (FBO)				<input type="checkbox"/>		

B: FARMERS PREFERENCES FOR INVESTMENT IN SOIL AND WATER CONSERVATION ACTIVITIES

Questions	Responses
of arrangement to reach all needy households for SWC practices in upper Tana Catchment?	3. SACCOs <input type="checkbox"/>
	4. Government bodies (GO) <input type="checkbox"/>
	5. Non-Government Organisation (NGOs) <input type="checkbox"/>
	6. Financial Institutions/Banks <input type="checkbox"/>
B4 Suppose there were to be an investment support for implementing SWC, would any one organisation listed above be able to handle the support effectively to reach needy households?	○1) Yes <input type="radio"/> ○2) No <input type="radio"/>
B5 If No what would be your suggestion in terms of organisation mix? <i>(Choose from B3)</i>	
B6 If investment support is required, in what form should it be?	○1) Low interest loan <input type="radio"/> ○2) Shared contribution <input type="radio"/>

Annex 2 Checklist of information/data collected during institutional interviews on Financial Mechanisms

1. How do you consider the potential role of your organisation in Green Water Credits approach to implementing soil and water conservation at a large scale in the Upper Tana catchment?
- 2a. What is your perception on institutional arrangements for effective implementation of the GWC activities?
- 2b. Which type of institution(s) should participate in the implementation phase:
 - technical support institution(s);
 - investment/financial support institutions(s);
 - guaranteeing institution(s);
 - coordinating institution(s); and
 - monitoring institution(s).
3. What would be the appropriate financial arrangements for the implementation of Soil and Water Conservation (SWC) investments?
 - 3a. Open reply
 - 3b. What would be other possible modes of financial arrangement?

Examples:

 - Loans/grants from a Bank to individual farmers;
 - Loan/grants to farmers communities; and
 - Other arrangements.
- 4a. Assuming that material/financial investments are needed by the farmer to implement soil and water conservation measures, what would be the best type of investment support that could be required to sustain the implementation process?

Examples:

 - *Grants?*
If grants are required in which form should it take? (e.g. cash; voucher for planting materials, labour and other inputs etc.)
 - *Farmer own contribution?*
If farmer contribution is required in which form should it take? (Own labour, cash, own tools etc.)
 - *'Soft' low interest loans?*
For example: Equity Bank proposes a Sustainable Commercial Investment Package (CSIP), because free money is not sustainable. Equity Bank emphasises that it should be included in a loan or combination of loan & grant underpinned by a sound investment plan. How can packaging of financial flows be done into CSIP?
 - *Shared contributions*-part grant and part farmer contribution?
If shared contribution is required, what would be the suggested ratio of project grants to farmer contribution?
 - *Others (specify): etc.*
- 4b. Suppose two types of investments may be needed: 1) relative large investment to install the SWC measures and 2) relative low maintenance investments (about 10 % of initial investments),
 - (i) *What would be your view and suggestions on the following possible sources of funding?*
 - Kick-start by national and international funds (establishment of GWC Fund). For example it is envisaged that TaNRMP will include a 10 million US\$ guarantee loan to Equity Bank to make it possible to establish a GWC Fund of an estimated 30 million US\$ (still to be determined) that
 - Exploring linkages with available grants for SWC measures (if any) (e.g. Water Services Trust Fund)
 - Contributions by downstream water users, which are the potential beneficiaries of the upstream improved management, such as urban and industrial water users (Nairobi Water Company, KenGen, etc.) and irrigators (Kakuji, Del Monte, horticultural, fruits and flower growers, Mwea)
 - A part of the Water Fee collected by WRMA – it is WRMA's policy that 25% of the water fee be ploughed back to catchment conservation, e.g. to be used for SWC

- Additional public funds from the Government - because public infrastructure will benefit from reduced flooding). For example: top up price of water and energy with a small amount (e.g. 1 %)
- Carbon Credits – because improved *green water* management will increase biomass production, thus also soil organic matter content. First calculation over a period of 20 years demonstrate the large potential of carbon credits (the GoK should prepare a proposal to attract international buyers).

(ii) Are there other existing Environmental funds, which potentially could be targeted at SWC? (Example Environmental fees paid by KENGEN etc.)

5a. Do you know of any experiences with funding flows in other projects that target Natural Resources Management and potential sources of funding?

Examples (if any):

Annex 3 List of Persons Interviewed/Contacted

Date	Name	Organisation/Institution	Telephone
6 th April 2011	Muthoni F. Livingstone	Project Manager, MKEPP	0722-596987
	Boniface M. Kikui	Agricultural Officer, MKEPP	0723 305269
	Paul Njuguna	NRM Officer, MKEPP	0722889362
	Eng Koome	Water Resources Expert, MKEPP	0720804169
2 nd June 2011	Paul Kaburu Nteere	DAEO Tharaka South Division	
3 rd June 2011	Kinyua Njeru	DAEO Evurore Division, Mbeere Norh District	0721587770
	Peter Kinyua	Frontline Extension Officer Kamarandi Location	
	Samuel Njeru	Agribusiness Development Officer, Evurore Division	
25/7/2011	Joel Kithure	Livelihood Programme Coordinator, Diocese of Meru, Tharaka-Nithi Deanery	0736590477 0725821663
26/7/2011	Nicholas Mokaya	DAO Meru South District	0723856041
26 th July 2011	Eng. Boniface Mwaniki	Regional Manager WRMA Embu	0722457573
	Eng. Peter K. Ngubu	WRMA Embu	0722682794
27 th July 2011	Elijah Mbugua	DAO, Kahuro District	0721304114
29 th July 2011	Joyce Njau	DAO, Gatundu North District	0733445322
2 nd August, 2011	Tom Bonyo	NALEP Coordinator	0733920195
	David Nyantika	NALEP	
	Mikael Segerros	Programme Advisor	0735398317
	Daphne Muchai	Deputy Head, Agribusiness Partnership and Lobby KENFAP	0733973831
3/8/2011	Philip T. Karuri	Project Leader, EADN/IFDC Kenya Country Representative	725864333
3 rd August, 2011	Eng. Peter O. Mangiti	Director Land Reclamation & Head, Donor Coordination Unit, Ministry of Water and Irrigation	0722522584
3 rd August 2011	Eng. Jacqueline K. Musyoki (Mrs)	Chief Executive Officer, WSTF	0722386317
	Phanuel Matseshe	Quality Assurance Manager, WSTF	0722720788
4 th August 2011	Mumbi Kimathi	Strategy & Partnerships Director Market & Chain Analyst, Farm Concern International	+254-20-4444031
	Phyllis Mungai	Markets & Development Research Farm Concern International	0715411834
4/8/2011	Esther M. Muiruri	Equity Bank, General Manager-Marketing Agribusiness	0732 112 664
May-Aug 2011	Mutuku Musyoka	Yatta Water and Sewerage Company	yattawaco@yahoo.com
May-Aug 2011		Nairobi Water and Sewerage Company	
25/08/2011	Simon Ngiere; and Pius	KENGEN	sngiere@kengen.co.ke
May-August 2011	David Migot	Kakuzi	dmigot@kakuzi.co.ke
May-August 2011	David Musundi	DELMONTE	dumusundi@freshdelmonte.com

GWC Reports Kenya

GWC K1	<i>Basin identification</i>	Droogers P and others 2006
GWC K2	<i>Lessons learned from payments for environmental services</i>	Grieg Gran M and others 2006
GWC K3	<i>Green and blue water resources and assessment of improved soil and water management scenarios using an integrated modelling framework.</i>	Kauffman JH and others 2007
GWC K4	<i>Quantifying water usage and demand in the Tana River basin: an analysis using the Water and Evaluation and Planning Tool (WEAP)</i>	Hoff H and Noel S 2007
GWC K5	<i>Farmers' adoption of soil and water conservation: the potential role of payments for watershed services</i>	Porras IT and others 2007
GWC K6	<i>Political, institutional and financial framework for Green Water Credits in Kenya</i>	Meijerink GW and others 2007
GWC K7	<i>The spark has jumped the gap. Green Water Credits proof of concept</i>	Dent DDL and Kauffman JH 2007
GWC K8	<i>Baseline Review of the Upper Tana, Kenya</i>	Geertsma R, Wilschut LI and Kauffman JH 2009
GWC K9	<i>Land Use Map of the Upper Tana, Kenya: Based on Remote Sensing</i>	Wilschut LI 2010
GWC K10	<i>Impacts of Land Management Options in the Upper Tana, Kenya: Using the Soil and Water Assessment Tool - SWAT</i>	Hunink JE, Immerzeel WW, Droogers P, Kauffman JH and van Lynden GWJ 2011
GWC K11	<i>Soil and Terrain Database for the Upper Tana, Kenya</i>	Dijkshoorn JA, Macharia PN, Huting JRM, Maingi PM and Njoroge CRK 2010
GWC K12	<i>Inventory and Analysis of Existing Soil and Water Conservation Practices in the Upper Tana, Kenya</i>	Muriuki JP and Macharia PN 2011
GWC K13	<i>Estimating Changes in Soil Organic Carbon in the Upper Tana, Kenya</i>	Batjes NH 2011
GWC K14	<i>Costs and Benefits of Land Management Options in the Upper Tana, Kenya: Using the Water Evaluation And Planning system - WEAP</i>	Droogers P, Hunink JE, Kauffman JH and van Lynden GWJ 2011
GWC K15	<i>Cost-Benefit Analysis of Land Management Options in the Upper Tana, Kenya</i>	Onduru DD and Muchena FN 2011
GWC K16	<i>Institutes for Implementation of Green Water Credits in the Upper Tana, Kenya</i>	Muchena FN and Onduru DD 2011
GWC K17	<i>Analysis of Financial Mechanisms for Green Water Credits in the Upper Tana, Kenya</i>	Muchena FN, Onduru DD and Kauffman JH 2011



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Ministry of Agriculture



Water Resources Management Authority



Kenya Agricultural Research Institute



Ministry of Water and Irrigation



International Fund for Agricultural Development



Future Water



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