ASSESSMENT OF ADOPTION OF WATERSHED MANAGEMENT APPROACHES FOR SUSTAINABLE CONSTITUENCY DEVELOPMENT FUND PROJECTS IN FUNYULA CONSTITUENCY, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree or any other award in any other university or any other institution.

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To my family for their unequalled love, support, encouragement and endurance.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADF	African Development Fund
AFLI	Africa Leadership Institute
CBO	Community Based Organization
CDF	Constituency Development Fund
CDG	Constituency Development Grant
CDFC	Constituency Development Fund Committee
CPOC	Constituency Project Oversight Committee
CPWF	Challenge Program on Water and Food
DPC	District Project Committee
EDF	Electoral Development Funds
EIA	Environmental Impact Assessment
EMCA	Environment Management and Coordination Act
ERS	Economic Recovery Strategy for Wealth and Employment Creation
FAO	Food and Agriculture Organization
HoA-REC/N	Horn of Africa Regional Environmental Network
ICIPE	African Insect Science for Food and Health
IEC	Information, Education Communication
IFAD	International Fund for Agriculture Development
IIRR	International Institute for Rural Reconstruction
IWRM	Integrated Water Resource Management
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
KHCR	Kenya Human Rights Commission
MDGs	Millennium Development Goals
MPLADS	Member of Parliament Local Area Development Scheme

MP	Member of Parliament
NEMA	National Environment Management Authority
NGO	Non Governmental Organization
PCARRD	Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
PMC	Project Management Committee
PRA	Participatory Rural Appraisal
R.o.K	Republic of Kenya
SOE	State of Environment
SPSS	Statistical Package for Social Sciences
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children Fund
U.S	United States
WFS	World Federation of Scientist

ABSTRACT

Management of the natural resource of a drainage basin primarily for the production and protection is considered essential for soil and water conservation. Despite an increase in CDF allocations, watershed management approaches are not integrated in local development projects to realize sustainability. The study assessed the need and ways of considering watershed management approaches in CDF projects. Key objectives included to determine the relative importance of factors that influence the allocation of CDF for community development projects; assess how the local bio-physical environment has been affected by CDF projects activities; establish the relevant community institutions and organizations to enhance watershed management activities; and determine the community perceptions and opportunities for enhancing watershed management activities in the CDF projects in Funyula Constituency. Three level multistage samples of 123 household heads and 8 purposively selected key informants were involved in the study. Quantitative information was mainly obtained using a questionnaire, an observation checklist and interview guide. Participatory mapping, transect walk and photography were used to obtain the qualitative information. Quantitative data was subjected to descriptive analysis mainly frequency distributions, and percentages presented in form of tables and graphs. Perceptions were measured using a 5-point likert scale, while participatory map and transect walk data were used in the analysis to complement quantitative data. According to the findings, 91.1% of households in Funyula earned their income from all farm activities which included both on-farm and off-farm activities with 66.9% earning less than Kshs. 1,500 per month. Poor roads network, health and educational facilities, need for clean and safe water supplies were main local factors that determine CDF allocations to various development projects utilizing a lot of CDF leaving watershed management unattended to. Among the effects, the most common were graded roads, rehabilitated dams, springs and dug fish ponds. Abandoned brick making sites and quarries, silted streams and cleared vegetation along the graded road were most visible effects of CDF activities on biophysical environment. Limited community participation in CDF decision making process, lack of watershed management knowledge and awareness on the need for undertaking Environmental Impact Assessment (EIA) on the CDF projects among the CDF committees and the public were the main limitations in considering watershed management approaches. The major household limitation to watershed management identified included, 82.1% limited credit and inputs, 50% lacked watershed management capacities. However, there was a positive correlation between lack of watershed management knowledge and community participation in watershed management ($r=0.013$, $n=123$, $p< 0.05$), more so, 43.1% of the respondents felt that high start up costs were the main limitation, and 19.5% identified interference from their neighbour. To conclude, CDF has undertaken projects which are bound to improve livelihoods through providing social services such as education and health, but they are not sustainable due to lack of watershed management approaches, therefore, the need to urgently address the sustainability need. The study recommends the integration of watershed management approaches such as undertaking EIA on CDF projects, capacity building the public and CDF committees, provision of incentives, alternative livelihood source, to enable community participate in watershed management activities.

CHAPTER ONE : INTRODUCTION

1.1 Background to the study

Watershed management is the management of the natural resource of a drainage basin primarily for the production and protection considered to be essential for soil and water conservation, which in the long run will enhance the prospects of self-reliance of nations in terms of food, fibre and energy, water supplies and water-based recourses, including the control of erosion and floods, and the protection of esthetic values associated with water (PCARRD, 1991). To achieve the goal of improving rural livelihoods and sustainable utilization of existing resources, the roadmap chosen should be through convergence of activities in the watersheds, such as agriculture, horticulture, livestock, fisheries, poultry and small enterprises that bring value addition to rural produce.

Watersheds have been described as a drainage basin of natural unit draining run offs of water to a common point (Singh, 1990). The smaller watersheds or mini watersheds can therefore be the central planning units of managing watersheds. Small tributaries located throughout the watershed contribute as much to ground and surface water availability as the streams and rivers of the upper watershed (Knapp *et al.* 2000; Ashby *et al.* 1999).
World-wide there is mounting interest in the relationship between land use and water resources. This has come about mainly because most developing and developed countries are experiencing a degradation of land and water resources, whereas the need for these resources is increasing, (Susswein *at el*, 2001). Watershed management is aimed at

maintaining and enhancing the potential of both the biotic and a biotic component of a watershed to provide goods and services to society, (Mazvimavi, 2002).

Attention to watershed management is increasing across the developing world after realizing the changes caused by unplanned and ad hoc activities where individual activities that affect land use practises are generally small and incremental (Biswas, 1990). Watershed degradation is a major threat for land productivity and food production. There is increasing evidence to show that investment in ecosystem conservation, such as watershed management, results in increased income for the rural poor (UNEP, 2007). At present, all levels of governments are increasingly attempting to address watersheds management as integrated systems through Integrated Water Resource Management (IWRM), comprehensive river basin management and other approaches. The adoption of city and community-based management and restoration strategies is also growing (Sedell *et al*, 2002).

Watershed development requires cooperation among all the key stakeholders in a watershed, and this may involve one or more entire communities (World Bank, 2008). However, many watershed projects around the world have not performed well because of the poor community participation (Johnson *et al*, 2001). For the government, a measure of decentralization of government institutions, policies, strategies and plans will ensure sustainable watershed management. This is in order to bring decision making, technical and managerial capacities closer to the rural populations (FAO, 1991c). Legislation, policies and incentives are needed to foster cooperation among land-users and to promote ecologically compatible development of natural resources (Rattan, 1995).

Like in other parts of developing world, watershed management in Kenya has been promoted through IWRM. However, degradation of watershed areas in Kenya is on the increase, resulting in diminished water resources. The main causes of watershed degradation stems from the abuse and poor management of forests and soils, overgrazing, extension of settlements into watershed areas, unsustainable felling of trees for fuel wood (about 70% of rural population in Kenya depend entirely on fuel wood for energy requirements) and other wood products (R.o.K, 2004). This loss has generally impacted negatively on important watersheds. Another challenge has been that of ensuring environmental considerations in all major national and sectoral policies, plans, and decision making processes (R.o.K, 2002a). Constituency Development Fund (CDF) is one of such strategies in Kenya.

After the enactment of the CDF Act of 2003, CDF has been instrumental in providing services at local levels where for many years no development programmes had been undertaken (UNDP, 2006). The building of schools and provision of school equipment, building of health centres, provision of tap water, water tanks and dams, rural roads, electricity, are just a few of such projects (Thomas and Mwabu, 2008). These establishments of development projects through CDF have increased the exploitation of rural biophysical environmental resources including forests, water and land, accelerated by effects of climate change and distortion of traditional land and water management practises. Although the projects are supplementary sources of livelihoods, investments in rural infrastructure (electricity, roads) improve living standards through access to markets

and inputs little consideration is given to the associated environmental impacts and involvement of communities in the managements of the natural resources.

The case of watershed management in CDF projects and by the farmers in Funyula Constituency is an interesting one. This is because farmers who are beneficiaries of these projects are required by law to fully participate in selection and management of these projects, including monitoring the effects of the projects on the watersheds and their livelihoods. However, like in many other parts of Kenya there is wide concern that CDF does not address their needs (UNDP, 2006). The amended CDF Act of 2007 requires consideration of environmental management as development projects provided that the funds allocated in one financial year to such projects do not exceed two percent of the total CDF allocated to that constituency (R.o.K, 2007a). Perhaps taping the financial resources from CDF and considering watershed management in designing Funyula Constituency CDF projects would contribute to sustainable community development projects. Therefore, inadequate monitoring and impact assessment of watershed programmes is a major concern. Globally, there are few comprehensive evaluation studies of integrated watershed management (Kerr *et al.*, 1996). Watershed development projects affect social, economic and environmental activities and they are mutually interrelated to ensure sustainability. Like in other parts of the world, research is required to determine what access poor communities currently have to land and water management, and how that is likely to change over time with changes in the demand (CPWF,2002) and other factors such as increased CDF projects in Funyula Constituency, Kenya.

1.2 Problem Statement

Although an integrated policy framework on environment and development exists, the Sessional Paper No.1 (of 1999) on watershed management has not been considered in most CDF projects to ensure sustainability including development projects in Funyula Constituency (R.o.K, 1999a). This is in contrary to the Kenya Vision 2030 which also acknowledges that the increase in development project is likely to impact negatively on the environment if sustainable development measures are not put in place (R.o.K, 2008c). In the Kenya National Development Plan (2002 to 2008), the Government of Kenya acknowledged that Kenya is faced with the sustainable development challenge of ensuring that environmental considerations are integrated in all major national and sectoral policies, plans and decision making processes. This calls for an inclusion of the necessary capacities and tools to assess and anticipate the impact of development activities on environment (R.o.K, 2002a).

In the past decades, farmers in Funyula Constituency did not participate in watershed management activities initiated by the government because farmers were suspicious of the government interventions because they believed their lands would be confiscated (R.o.K, 1989). In addition, Environment Management and Coordination Act (EMCA, 1999b) requirement of conducting Environment Impact Assessment (EIA) on all projects that affect the environment is not observed in most CDF projects (R.o.K, 2008a). Unsustainable exploitation of biophysical environmental resources such as building stone, timber, sand, bricks making, siltation of streams along the bridges and building sites has increased in the recent past as a result of CDF projects activities. This calls for participation of all stakeholders in land-use planning since real participation implies that

land users are fully involved in the design of conservation packages and accept a major responsibility for their implementation (IFAD, 1992). Therefore, the study was necessitated on observations that despite an increase in CDF allocations, watershed management approaches are not prioritized in local development projects to realize sustainability and CDF does not enhance community participation in watershed management activities.

1.3 Justification of the Study

The study was necessitated by observations that despite an increase in CDF allocations in Funyula Constituency, watershed management approaches are not integrated in local development projects to realize sustainability. Despite the increase in local development projects such as graded roads, education and health facilities, poverty levels are very high at 65.9% (R.o.K, 2007b). The area has numerous hills, streams, springs and wetlands with most of them draining in to River Sio that drains into Lake Victoria forming a common hydrological unit. Funyula Constituency is located in the wider Lake Victoria basin, in the Lower Middle Agro-ecological zone, due the proximity to the lake; evaporation varies between 1800mm to 2000mm per year rendering air humidity to be relatively high. Farming is the main socio-economic activity where traditional farming methods the production depend on the health of ecosystem , unsustainable farming practises including cases whereby the farmers exploit fragile environment like hills, riverbanks and road reserves without initiating appropriate conservation measures are common (R.o.K, 2007b). Therefore, the community's activities are characterised by poor watershed management activities.

1.4 Research Objectives

The overall objective of this study was to assess factors behind watershed management approaches in CDF projects to ensure sustainable community development projects. The specific objectives included;

i. To determine the relative importance of factors that influences the allocation of Constituency Development Funds for community development projects.

ii. To assess how the local bio-physical environment has been affected by Constituency Development Fund projects activities in Funyula Constituency.

iii. To establish the relevant community institutions and organizations to enhance community participation in watershed management activities using CDF.

iv. To determine the community perceptions and opportunities for enhancing watershed management activities in the CDF projects.

1.5 Research Questions

The study was guided by the following research questions.

i. What are the relative importance of factors that influence the allocation of Constituency Development Funds (CDF) for community development projects?

ii. How has the local bio-physical environment been affected by Constituency Development Fund projects activities in Funyula Constituency?

iii. What are the relevant community institutions and organizations that CDF can be used to enhance community participation in watershed management?

iv. What are the community perceptions and opportunities for enhancing watershed management in the CDF projects?

1.6 Theoretical and Conceptual Framework

1.6.1 Theoretical Framework

Watershed management is a very complex activity where many components and processes are involved. The way of identifying and organizing the elements can be achieved through System Theory. General System Theory, which was developed by Ludwig von Bertalanffy and others (Bertalanffy,1968), provides an analytical framework which can be used to describe some of the many factors involved in watershed management and community development. Some of the key concerns in community development, such as accessing power and influence, understanding the dynamics of inter-group relationships, and considering the changes involved in planning development activities, can be understood and described using System Theory (Laszlo, 1996).

The systems design approach seeks to understand a situation as a system of interconnected, interdependent, and interacting problems. Likewise, the solutions it seeks to create emerge from a vision of the entity taken as a whole. Such an orientation permits the design of the future through an informed understanding of the dynamics that govern evolutionary systems. It implies that we take responsibility for the creation of our future in co-evolutionary interdependence with our social and physical environment. This is based on the belief that we can shape our future on the one hand through the power of understanding the characteristics and requirements of the environment, and on the other through our aspirations and expectations (*Ibid*).

Systems design is participatory by nature: significant social change can be brought about only if those who are most likely to be affected by it participate in soliciting it, and choose how it is to be implemented. Since in societal systems human beings are the critical factor, change must necessarily both emanate from and incorporate them. Systems design advocates for anticipatory democracy, where people actively apply their skills to the analysis and design of socially and ecologically sustainable systems by becoming active participants in shaping their future. Groups of people engaged in purposeful systems design form an evolutionary learning community, and such communities make for the emergence of a culture of evolutionary design (Laszlo and Krippner, 1998). Evolutionary systems design leads to the creation of evolutionary pathways for the sustainable development of life on earth. Given the theoretical constructs of general evolution theory, and the methodological constructs of social systems design approaches, evolutionary systems design confronts the challenges posed by purposeful stewardship of the earth's life support systems (*Ibid*).

Evolutionary competence refers to the state of self-actualization (of individuals and groups) that is marked by the mastery of the knowledge, the abilities, the attitudes, and the values required for co evolutionary actions, and therefore, for the pursuit of sustainable modes of being. Such modes of being concern both the products and the processes of change in terms of the degree to which they are — socially desirable, culturally acceptable, psychologically nurturing, economically sustainable, technologically feasible, operationally viable, environmentally friendly, and generationally sensitive

By monitoring all these aspects simultaneously, a process of CDF development project (individual, societal, or global) can be said to be evolutionary if it involves an adaptive strategy that ensures the continual maintenance of an increasingly robust and supportive watershed development and environment in general. Evolutionary design seeks to identify opportunities for increasing the dynamic stability and self-sufficiency of an individual or group in interaction with it's the broader set of watershed components of its particular time and place. It indicates areas of evolutionary potential to be developed to the advantage of the complex dynamic systems involved in ecosystem interaction now and into the future.

1.6.2 Conceptual Framework

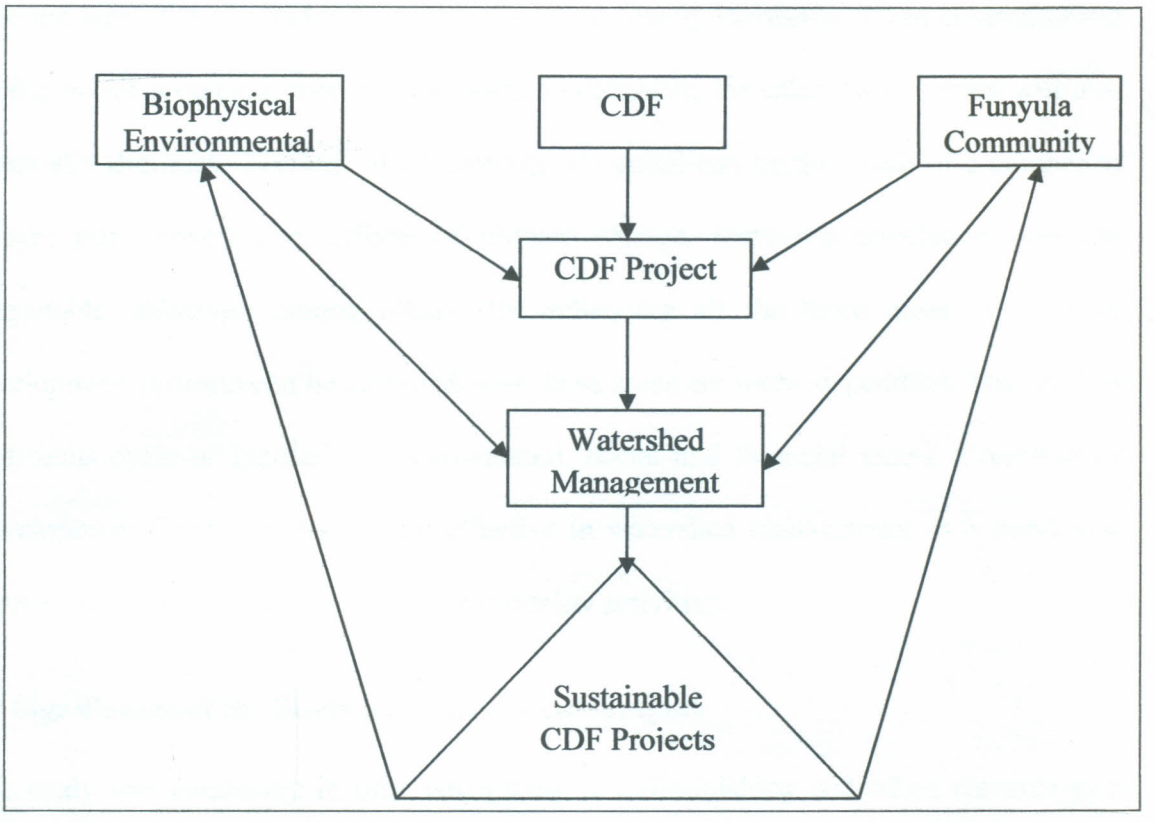


Figure 1.1: Conceptual Framework showing relationship between Biophysical Environment, CDF Project, Watershed Management and Sustainable CDF Projects.

Source: Author, 2010

Figure 1.1 above show how (CDF) financial, social (Funyula community) and biophysical environmental components interact in a watershed system. The interaction can be considered at either the household, solidarity group or community level. Its premise is that financial, social and environmental systems are mutually supportive. The triangle in the middle represents the way the sustainable CDF projects methodology links the flows of these capitals into the household or group economy supported by CDF.

When working ideally as the flows of each provide goods and services and at the same time the size of the triangles do not decrease but ideally increases. When environmental capital is not protected, this triangle starts to diminish; the other two capitals will also eventually diminish. The loss of environmental capital can be the result of a number of causes; poor governance, effects of climate change, increased population pressure, inequitable utilisation among others. By enhancing all the three areas, community development projects can be sustainable as these areas are inter- dependent. The result is a virtuous cycle of increasing environmental, social and financial assets. Constituency Development Fund projects are not effective in watershed management as a standalone intervention in the absence of other conservation activities.

1.7 Significance of the Study and Anticipated Outputs

The study was conducted in time when there is a diminishing watershed resource as a result of increased development activities on ecosystems, increased human and animal pressure on the natural resources and a global threat of effects of climate change with very little being done to ensure communities participate in natural resource conservation and protection. This information could be used by communities, government and private sector, in partnership with other stakeholders by CDF for sustainable community development projects to ensure;

i. Sustainable utilization of biophysical environmental resources.

ii. Communities participate in monitoring of CDF projects.

iii. Improved community livelihoods and well-being.

1.8 Scope of the Study

The study covered the CDF projects and watershed systems lying in the Funyula Constituency, Busia County, in Western Province, Kenya. The study assessed factors that could enhance community participation in watershed management utilizing CDF to ensure sustainable community development projects.

1.9 Definition of Terms

Allocation: refers to whether decentralized resources are allocated in conformity with the national development priorities. It is presumed that local communities are best placed to know the exact nature of their development needs than distant national political leaders. Hence, what communities identify as priorities are compared to national sector priorities and the proportion of funds allocated to each priority sector.

Community Awareness: The general enlighten of the people about CDF, access to CDF guidelines, and inclusiveness as evidenced by inclusion in committee membership selection and identification of community's pressing needs. Responsiveness to the demands of the local community pressing needs vis-à-vis the projects identified, feedback mechanism, and participation in tendering and procurement.

Community Participation: It includes community involvement in project selection, implementation, and in operation and maintenance.

Constituency Development Fund: Decentralised fund comprising of an annual budgetary allocation equivalent to 2.5% of the government's ordinary revenue established in Kenya in 2003 through the CDF Act. The fund aims to control imbalances in regional

development targeting all constituency-level development projects, particularly those aiming to ending poverty at the grassroots.

Household: Any group of persons or a person generally raised together by ties of kinship, usually reside together under a single roof or several roofs within a single compound and share a common source of food.

Household Head: Could be male or female, responsible for decision making in a household.

Sub location: Is an administrative unit in the Kenyan government administrative structure headed by an Assistant chief.

Sustainable: The project being able to be economically viable, socially acceptable and environmental friendly in order to take care of the present generations' needs without compromising the ability of coming generation to meet their needs.

Sustainable CDF project: (Dependent variable in the study). The CDF funded project that is economically viable, socially acceptable and environmental friendly in order to take care of the present generations' needs without compromising the ability of coming generation to meet their needs.

Watershed Management: Is the process of formulating and carrying out a course of action involving the manipulation of resources in a watershed to provide goods and services without adversely affecting the soil and water base. Usually, watershed management must consider the social, economic and institutional factors operating within and outside the watershed area.

Watershed Management Approach: (Independent variable in the study). Is effort to establish a wider scale of reference to develop programs so that they address or remedy not only a site-specific issue, but also consider the implications of these programs on the a watershed. It is also used to more efficiently coordinate programs within a single watershed so projects are implemented in concert to improve overall conditions. The watershed management approach also considers cross-media implications within the system.

1.10 Constraints to the Study

Constraints to this study included the following: First, the sample population was homogeneous in terms of language, culture, ethnicity and occupation. To overcome this constraint, the study used a complementary approach by combining participatory community mapping, questionnaire and interview guide methods of data collection administered to different respondents. Second, respondents may have given a response because they thought that is what is expected of them or they would like to present CDF service providers in a negative manner. For example, the question on whether the households had received any assistance for watershed management from CDF may have introduced errors. Third, sampling errors in this study were minimized by involving all the households in each of the three locations covered in this study. Consequently, under the simple random sampling technique used to draw the sampling unit, all the households in the seven locations had an equal chance of being selected. However, it was made clear to each participant that he or she was free to participate or refuse to do the respondents were assured, that their participation would be confidential, and that any information

given would not be used in any way that could be used against the community. Finally, there were problems in accessing CDF financial statements; records from CDF board were used. By computing averages, the effects of missing financial year were minimized.

1.11 Organization of the Thesis

This thesis is organized into five main chapters. The chapter that follows presents relevant literature review. Chapter three describes the study area, methodology and procedure used in data collection and analysis, while the fourth chapter presents research findings. The findings are systematically discussed under each of the four objectives sought. The fifth chapter on the other hand presents conclusion and recommendations for the study. Lastly, there is a list of alphabetically organized references of literature cited during the study and attached appendices.

CHAPTER TWO : LITERATURE REVIEW

2.1 Overview

This chapter reviews literature on various aspects of watershed management approaches in CDF projects including effects, importance, challenges community experience and opportunities documented by other authors. In order to address the study objectives, this chapter was organized in the following sub-themes; Allocation of CDF to development projects; CDF and sustainable livelihood; CDF and watershed management; CDF and community participation in watershed management; impacts of CDF in environmental management; and community institutions and watershed management. According to this study, the three main components in watershed management approaches are land management, water management and biomass management. Consequently, watershed management is more a philosophy of comprehensive integrated approach to natural resources management. It aims at integration of social resources management with natural resource management. The approach is generally preventive, progressive, corrective and curative. Watershed management involves the judicious use of natural resource with active participation of institutions, organizations, in harmony with the ecosystem.

2.2 Allocation of Constituency Development Fund to Development Projects

Globally, parliamentary involvement in grassroots projects and in community development has been growing in a diverse set of countries, including Kenya (CDF), Pakistan, India (Member of Parliament Local Area Development Scheme, MPLADS), Uganda, Bhutan (Constituency Development Grant, CDG), Jamaica (CDF) and Papua

New Guinea (Electoral Development Funds), CDF resemble the venerable U.S. congressional allocations generally called "pork barrel," "earmarks" or "member items" in national and state-level policy making. Operations of CDFs have sometimes been controversial because they raise fundamental questions about the efficacy of government service delivery, the extent to which such service delivery can be made accountable, the role of legislators in selecting development priorities, and how public participation in policy making can be made more meaningful (Baskin et al, 2010).

The CDF Act of 2007 provides for the process of selection and allocation of CDF to the community development projects as follows; CDF project selection begins at the grassroots level with community groups identifying potential projects, prioritizing them and presenting final recommendations to the Constituency Development Fund Committee (CDFC). The CDFC prioritizes the final list of projects by places them in a 2nd and 3rd schedule, and specifies the name of the constituency, year of funding and an identification number for each project (similar projects may be lumped together). The 3rd schedule serves as a more detailed snapshot of the project list than the one appearing in the 2nd schedule. The 3rd schedule also provides a status report that is crucial when assessing disbursement rates and amounts. The local community works in consultation with the CDFC, which provides guidelines for applying for funding and assistance in assessing project costs and particulars. Thereafter, the CDFC submits the finalized list of projects to the District Project Committee (DPC), which should meet annually to ensure that there, is no duplication of projects. Thereafter, the CDFC then submits the list of projects to the Constituency Development Fund Board along with the 2nd and 3rd

schedule and any other pertinent information, which includes minutes from the community level project selection committee.

The Constituency Development Fund Board compiles a complete list of all proposed projects from the constituencies, and then makes final recommendations from this list. Any disputes over potential projects are referred to the Constituency Fund Committee, which makes a final determination over disputed projects. Lastly, the Electoral Commission of Kenya provides the Constituency Development Fund Board with constituency codes through which all projects can be identified. The Board then disburses money to constituency accounts. Ministers' approve disbursements from the constituency bank accounts to specific projects. Each disbursement is minted and is subject to the approval of three signatories.

2.3 Constituency Development Fund Projects and Sustainable Livelihoods

In Jamaica, the Government recognizes that the CDF is an important part of our social safety net and the CDF enables Members of Parliament to be more responsive to individual and community needs (Ministry of Finance and the Public Services, 2010). In 2008-2009 data on implementation of the CDF in Jamaica indicated that huge allocations went to Human and Social Development projects, to economic enablement, to disaster mitigation and to physical infrastructure projects (Jamaica Observer, 2009). Funded areas included: road repairs, economic enablement, water projects, rural electrification, sports development, education/scholarship grants, assistance in purchasing school books, general upgrading of bridges and other facilities, construction of computer laboratories

and homework centers, as well as rehabilitation of community centers (Jamaica Labour Party, 2008).

The CDF mechanism provides several opportunities to further strengthen the local adaptive capacity possibly funded through the CDF in order to strengthen local livelihoods assets (Mikko *et al.*, 2009). In most cases CDF has been instrumental in building of schools and provision of school equipments; building of health centres; provision of tap water, water tanks and dams; rural roads; electricity, are just a few of such projects, (Thomas and Mwabu, 2008) which have greatly affected the livelihoods of the communities . These capital development projects have contributed to the government's agenda to the fight against poverty, equitable distribution of resources and improve communities' livelihoods. For instance, through the CDF, many schools have been built and equipped. This has aided the government's policy of providing free primary school education. In the health sector, many hospitals, dispensaries, maternity wings within existing health facilities and clinics have been built in record time. This has helped decongest larger district level hospitals. Additionally, the CDF has helped crime-prone areas to construct police posts which the central government has been quick to bring into operation to reaffirm its commitment to public safety (Obuya, 2008).

Improvement in local level social capital has been pursued by developing CDF. Constituency Development Fund Committees (CDFCs) established within each constituency with an MP who serves as the chairman and 14 additional members appointed by the MP is mandated to review and approve project proposals and request for

funding, and determine appropriate allocation of funds, Project Management Committees (PMC) made up of members of the public who manage, oversee and monitor ongoing individual CDF project and stakeholder forum supports social relationships (social asset) in the communities that can be also utilized in pursuit for other livelihood activities including adapting watershed management approaches.

There are several elements in the project that contribute to human assets and enhanced local skills, mechanism to finance water, health, nutrition, sanitation and hygiene investments, and support communities in implementing these activities, including reinvestment, and institutionalised capacity at zonal and regional levels (Mikko *et al.*, 2009). CDF can be an effective tool of poverty alleviation; is need for enhancing poverty eradication efforts; could be used enhance a positive relationship between the MP and the citizens through regular consultations and interactions (Africa Leadership Institute, 2007). However, CDF mechanism has not adopted watershed management approaches to sustainable livelihoods. With initiatives of local organizations through trade exhibitions in which local Members of Parliament (MPs) participate have been converted into forums for policy dialogue. For instance, they have given farmers the opportunity to impress upon their MPs the need to investing the CDF money in agricultural projects (World Agro Forestry Centre, 2006). This has come as a result of communities realizing the importance of CDF in improving their livelihoods. To achieve the goal of improving rural livelihoods and sustainable utilization of existing resources, the roadmap chosen should be through convergence of activities in the watersheds, such as agriculture, horticulture, livestock, fisheries, poultry and small enterprises that bring value addition to rural produce. For example, CDF committees are able to plan and implement such projects that

are ecological and biological friendly while providing them with alternative means of income and subsistence. The challenge is to capture key community priorities within formal district planning processes and to secure financial resources to support their implementation. Funding available to local communities under the CDF do not adequately support initiatives centred on sustainable environmental management and livelihoods development (NEMA and UNDP, 2009).

Land and water degradation threaten food security for many of the poorest and most food insecure living in South Asia, Africa and Latin America (Kaiser, 2004). It also contributes to persistent poverty, and results in decreasing ecosystem resilience and provision of environmental services (Costanza *et al.,* 1997). The major impetus for establishing a CDF in Uganda is to address poverty at the grassroots level, where other government poverty reduction policies have not been able to succeed more fully (Africa Leadership Institute, 2009). An overview of funding to 9 rural and 2 urban sample districts in the year 2004/05 highlighted that very few CDF committees prioritized funding on the environmental conservation sectors (R:o.K, 2006).

2.4 Constituency Development Fund Projects and Watershed Management

Watershed development approaches in India are mainstreamed in the country's development agenda. The argument for a watershed development approach is that it is a natural hydrological unit (in technical terms) for soil and water conservation. Watershed development now commonly include various development activities like alternate

livelihood options, credit facility, micro insurance, livestock management, capacity building and afforestation (Joy *et al.*, 2005).

Managing a watershed involves taking into consideration the interaction in time and space not only of individual plots but also of the common pool resources such as forests, wetlands, springs, gullies, roads and footpaths, and vegetative strips along rivers and streams (Swallow *et al.*, 2001). Despite the fact that CDF has been instrumental in utilizing these resources and providing such services in Kenya, watershed management approaches have not been integrated in CDF projects. Constituency Development Fund projects decision making process is characterized by lack of professionals in several fields; watershed management, limited community participation, and political dominance (R.o.K, 2008a) this might be a major cause for non consideration of watershed management approach in CDF projects.

Land development through the promotion of watershed development and its management play an important role in the sustainable development of land and water resources. This has the potential to create significant local benefits and enhance the capacity of communities to deal effectively with conditions of drought. Hiwre Bazaar village in India is an example of the realization of this potential (Sanjay and Sreeja, 2008). Constituency Development Fund mechanism has been seen to have important role to play in combating adverse effects of climate change. Since combating climate change is a high-investment undertaking as depicted by the indicative costs in the Action Plan, there is need to include the CDF in order to have great impact at the grassroots level especially in dealing with

climate-related emergencies that affect the watersheds (R.o.K, 2010b). Therefore, CDF has been identified as an opportunity to encounter adverse effects of climate change in Kenya through financing climate adaptation and mitigation projects.

2.5 CDF and Community Participation in Watershed Management

Current devolution of resource management and financing like the CDF provide opportunities for "real" community participation in planning and decision-making (Thomas *et al.*, 2007). In Jamaica, MPs were required to develop a five-year development plan for their constituencies to be submitted by September 30, 2008. In doing so, they must hold consultations with their Constituency Project Oversight Committee (CPOC), which is comprised of representatives of community-based organizations, influential individuals and non-governmental agencies, to determine priority projects appropriate for their constituency. This community participation is essential to the selection of a project with the Member of Parliament as the lead facilitator. The responsibility for selection and prioritization of project ideas must be that of the constituents and not the MP (Jamaica Gleaner, 2009).

Community participation in CDF projects is an important factor for enhancing community participation in watershed management. Constituency Development Fund is not a political pork barrel. Rather, it is a fine example of democracy in action, people participation in community development and good governance worthy of encouragement and support (Jones, 2010).

However, despite efforts of the Kenyan government to adopt bottom-up approaches, many critical watershed management decisions remain a preserve of the central government. This double-standards approach has perpetuated unsustainable practices in micro watersheds, especially in rural areas. It is important to understand the conditions when people participate in watershed management approaches. These are: (i) making people aware of potential benefits of collective action in conserving and managing natural resources; (ii) including demand driven activities in the watershed program; (iii) empowering people in planning, implementing and managing watershed programs; and (iv) expecting high private economic benefits (Joshi *et al.*, 2000). The major challenge is to benefit the landless, the socially disadvantaged and resource-poor participants who have low ability to pay for the different programmes. Like in other parts of the world, in Kenya research is required to determine what access poor communities currently have to land and water management, and how that is likely to change over time with changes in the demand (CPWF,2002)

In the report by National Anti-corruption Campaign Steering Committee the government of Kenya found that low public involvement or community participation in project identification and prioritization may be responsible for the low project ownership that characterizes many CDF projects in some constituencies (R.o.K, 2008a). Even though the governing principle of the CDF is to encourage community participation, an institutional framework for community involvement is missing. The overall characteristic of the CDF therefore is that local councils as well as parliament retain control of

resources while the local communities lack awareness about the objective, rules and procedures governing their access to CDF, their roles and mandates.

Appropriate community participation tools and approaches such as Participatory Rural Appraisal (PRA) have not been adequately utilized for entrenching community participation, and the use of Information, Education Communication (IEC) to channel information to the general public is minimal. District Information offices at the district are either nonexistent or ill equipped. As a result, districts do not have established mechanisms to collect, process, store and disseminate information on local development (ADF, 2007), including watershed management information. Constituency Development Fund watershed projects will be more efficient and effective when users are given a role in managing their own watershed resources. However, many watershed projects around the world have not performed well because of poor community participation (Johnson *et al.*, 2001).

The key to the success of any watershed project and its sustainability depends on people's participation. For achieving the desired participation of people, the roles of community organizations, groups and other stakeholders are crucial. Local people must play an active role starting from project design, moving to implementation and the project maintenance. At central level, there are faint possibilities to implement the above measures unless they are described and executed with the direct involvement of populations concerned (Lundqvist, 1985).

In India, participatory approaches to watershed development have been found to be better than technical approaches because they better succeed in addressing the disincentives for household investments in soil and water conservation (Joy *et al.*, 2005). Participatory approaches not only subsidize the costs of investments, but also pay attention to wider constraints for farm household production. This may involve investments in micro – credit and agricultural extension (Farrington *et al.*, 1999). CDF projects should ensure participatory approaches including local awareness rising, institution building and empowerment. Coordination mechanisms should be created to facilitate the cooperation and collective decision making needed for long term sustainability of the efforts. The Indian case is the best lesson the Kenyan government can learn, to use CDF to effectively manage the micro watersheds. CDF Act (2007a) provides for active citizen participation in development which enhances ownership, democratization and sustainability. However, this participation is at the behest of the MP since the Act does not provide for recourse to constituency should the MP fail to hold local consultation forums (KHCR, 2010).

Surrowiecki (2004) emphasizes the importance of community participation in development programmes by demonstrating how the combined intelligence and input of groups of people can create optimum conclusions about whatever they want to do. He states that: Often crowds like markets or other forms of collective thought are smarter than the individuals who participated in them. The community, like the markets, is made up of diverse people with different levels of information and intelligence and yet when you put all those people together, they come up with generally intelligent decisions.

Emphasizing the importance of community participation, Surowiecki (2004) argues that, under the right circumstances, community groups are remarkably intelligent and often smarter than the smartest people in them. According to this approach, it is believed that masses may be wiser than the professional elites in making allocation and distribution priorities based on local knowledge. Thus, central planners have neither the information nor the incentives to make good decisions compared with the knowledge and incentives of decentralized economic actors and the people at large. Therefore, this study finds out that people participation in CDF projects is central towards ensuring resource efficiency in integration of watershed management approaches in CDF projects.

2.6 Impacts of Constituency Development Fund in Environmental Management

Since its inception, CDF has played an important role in fighting poverty at the grassroots level through the implementation of community based projects which have long term effects of improving the peoples' economic well being. Constituency Development Fund has been instrumental in providing services at local levels where for many years on development programmes had been undertaken (UNDP, 2006). Biophysical environmental resources such as land, forests, and water have been exploited to an extent that watershed management approaches should be mainstreamed in CDF to realize the sustainability of the resources. This is to foster local governance, including good environmental stewardship; improve service delivery; bring government and the people closer together; and increase the response capacity of the elected representatives (Munroe, 2010).

Constituency Development Fund Act (2007) provides 2% of CDF allocation each financial year to be used in environmental conservation. However, most CDF projects with negative environmental quality effects are found to be implemented in many constituencies. Failure to undertake feasibility studies and on environmental impact assessments, coupled with weak project implementation guidelines is likely to have negative implications for projects sustainability (R.o.K, 2008a). At the same time, CDF can be utilized to enhance community participation in the management of these watersheds as Funyula watersheds. Finally, EMCA of 1999 provides legal instruments for the protection and conservation of rivers, lakes, and wetlands, cultural sites of significance, hilltops, hillsides, mountain areas and forests. The policy instruments include environmental impact assessment, economic instruments such as fiscal incentives, environmental quality standards, restoration orders, conservation orders and environmental assessments.

Under EMCA (1999), developers and resource users are required to undertake environmental audits or impact assessments. This provision supports the Physical Planning Act, which requires developers to advertise and seek approval of change of use of a particular land unit. Through restoration, conservation or assessments, the community can effectively demand restoration, conservation or restrict the right, interest and use of a burdened land with compensation as deemed appropriate. Most of other resource based policies and legislation have been formulated based on the environmental framework (Thomas *et al.*, 2007). These legislative frameworks apply to the CDF

projects; however, it seems many are not followed due to lack of knowledge amongst the fund managers and the community at large.

In the report by KARI and ICRAF (2006), the low impact of CDF and other environmental development projects in Kitui District was due to wrong priority in project funding. For example, previous work by Forestry Department and KEFRI led to a forestation of Kitui municipality and its immediate environs (KARI and ICRAF, 2006). This has led to significant improvement in the rainfall received yet there has been no concerted effort to initiate such projects that are considered as long term to serve the political aspirations of sitting MPs. Misunderstanding of the concept of environment and development is a challenge such that a politician would rather put up a building to house a dispensary for purposes of reducing child mortality without addressing the underlying problems; lack of clean water being a major contribution to the increased child mortality.

2.7 Community Institutions and Watershed Management

Watershed development requires cooperation among all the key stakeholders in a watershed to involve one or more entire communities (World Bank, 2008). Though watersheds are physical units in nature, institutions evolved over time which are essential for their management do not strictly follow their physical boundaries. These institutions interact in diverse action arenas to facilitate or constrain actors involved in managing watersheds. Again a number of factors; physical, social and cultural influence the arena, but institutions constitute a crosscutting factor and a particular driving force in the decision making process (Young, 1999). Agents interact with each other to take decisions

within and among diverse arenas. In each, institution integrates in diverse and complex ways to facilitate and constrain decisions. Understanding the institutions involved in watershed management will improve understanding of the complexity and interactions among institutions in various arenas. Three principal types of institutions interact in watershed development arena and enable agents to take decisions: (i) policy, (ii) legal, and (iii) administrative institutions (*Ibid*).

Diverse forces influence resource management in watersheds, but the institutional options available invariably do not match with ground reality. External agencies (state governments, donors, NGOs) impose different concepts and conditions (carried through funding) by creating new institutions. Rarely do these funding agencies attempt to examine and modify the institutional failures of existing distributive governance. The poor who are caught between the macro (formal) and micro (informal) are being increasingly marginalized in the process. Addressing them requires an effective role of various institutions in addressing education, lack of income generating opportunities, overcoming the constraints imposed by natural factors, and importantly, social forces that have often led them to poverty (Sharma *et al.*, 2005).

2.8 Summary and Conclusion

From the literature review, it has emerged that watersheds play important role in sustainable livelihoods of many resource poor Kenyans. Constituency Development Fund can play an important role in promoting sustainable livelihoods by enhancing watershed management at the grassroots level through community participation. The Indian case where watershed management approaches have been integrated in local decentralised

development strategies, serve as a good example for Kenya. However, CDF projects decision making process is characterised by lack of enough watershed management experts, limited community participation, and lack of awareness and non adherence to CDF Act (2007a) and EMCA (1999) regulations of conducting environmental impact assessment to establish the impacts of CDF projects on the watersheds and environment in general. These components are important in ensuring sustainability of CDF projects and integration of watershed management approaches in CDF projects.

In the literature, the low impact of CDF in watershed management and other environmental development projects in Kenya is due to wrong priority in project funding. However, no study has been done on CDF and watershed management approaches in Kenya.

In summary, literature reviewed established the gap where, research is required in Kenya to determine what access poor communities currently have to land and water management, and how that is likely to change over time with changes in the demand (CPWF,2002); the allocation rationale and effects CDF has on the biophysical environment; understanding the perception of the people on CDF and watershed management activities and institutions in the community which CDF can utilize to manage the biophysical environment, and it is hoped that the data gathered in this study will bring into focus the significance of integrating watershed management approach in CDF project to ensure poverty reduction and achievement of sustainable development.

CHAPTER THREE : METHODOLOGY

3.1 Study Area characteristics

This study was conducted in Funyula Constituency. The rationale for the selection of this constituency was that, first it had high poverty levels of 65.9% (R.o.K, 2007b) despite it benefiting from CDF. Secondly, the area had numerous hills with numerous streams, springs and wetlands most of them draining in to River Sio which drains in Lake Victoria thus forming a common hydrological unit.

3.1.1 Position, Population and Administrative Units

Funyula Constituency in Busia County, Kenya borders Uganda and lies between latitude 0^0 19'0N, longitude $34^0$7'0E. The average population density of the area is 265.1 persons per kilometre square (R.o.K, 2010a) as indicated in Table 3.1 and Appendix I;

Table 3.1: Population Distribution by Locations in Funyula Constituency

Location	Household number	Area in square km	Density
Nambuku	2,453	32.7	364
Namboboto	3,418	37.3	436
Odiado	2,038	22.6	425
Nangosia	2,283	27.5	386
Ageng'a	2,902	44.5	313
Nanguba	2,368	36.3	315
Bwiri	3,933	64.3	308
Total	19,395	265.1	353

Source: Kenya Census Report (2009)

3.1.2. Socio Economic Activities

Farming is the main socio-economic activity in Funyula Constituency; cassava, sweet potatoes, arrow roots, finger millet, sorghum, quill, chicken, ducks, termites, bananas, groundnuts, cowpeas, green-grams, monkey nuts fish are the main subsistence food. Crop production is majorly for subsistence purpose; therefore, the nature of farming is of low input level, and local seed varieties are used by about 80% of the farmers (R.o.K, 2007b). Further, very few farmers use mineral fertilizer and manure for crop production. This means soil fertility replenishment is minimal. Yet the soils in some parts have inherent low level nutrients capacity. Consequently, after 3 – 4 continuous cropping seasons the yields drop drastically. The coping mechanisms by the farmers to have adequate produce is opening new fields, thus reducing the vegetation cover. In some cases farmers exploit ecologically fragile ecosystems like hills, riverbanks and road reserves without initiating appropriate conservation measures.

Most labour in this area is supplied by women and youth who organize themselves in working teams/clubs. The peak labour demand period is observed at planting, weeding and harvesting of cereal and pulses crops. The peak period for demand for labour falls in the months of April to July and October and November of every year. Despite the scarcity of trees in Funyula Constituency, charcoal burning is still a booming business. The irony of this is that although charcoal production and transportation is illegal, it is very legal to buy and use charcoal, putting the forest remnants in danger from being depleted.

3.1.3 Climate and Hydrology

Funyula Constituency is in the wider Lake Victoria basin, which is a lower middle agro-ecological zone. Rainfall pattern in the region varies between 1020mm and 1270mm mean annually. The long rains may start as early as mid February and last until May mid with a peak in April. The short rains may last from mid November to January mid. It is unreliable and drought is an ever expected phenomenon. The annual mean maximum temperature ranges from 26^0 C to 30^0 C, while the annual mean minimum temperature varies between 14 ^{0}C to 18 ^{0}C. The evaporation in this region is between 1800mm to 2000mm per year (R.o.K, 2007b). The high evaporation is due to the proximity of the area to Lake Victoria rendering humidity of the air to be relatively high. River Sio is the main river flowing through this area, a few kilometres to Lake Victoria. Table 3.2 summarises the main source of water to residents of Funyula Constituency.

Table 3.2: Funyula Constituency Rural Household by Main Source of Water

Pond/ Dam	Lake	Stream	Spring/well /Borehole	Piped into dwellings	Piped	Rain water	Vendor
1,008	1,629	3,797	11,241	183	1,387	130	18

Source: Republic of Kenya, 2010; Kenya Census Report (2009)

3.1.4 Topography and Geology

The area has undulating topography that supports agriculture but constrains the development of roads due to the large number of bridges (R.o.K, 1997). Along river Sio, the area forms of wetlands which comprises of papyrus colony broken by irregular water channels and occasional small lakes with grassy islands.

3.2 Research Design

This study utilized a mixture of qualitative and quantitative information solicited from community and relevant district service providers whose services directly affect watershed management and CDF in Funyula Constituency. A mixed method approach was adopted in this study because of its importance in: triangulation and ensuring validity of the data; provision of complementary information for clarification or elaboration of given factors guided the collection of proceeding data.

3.3 Targeted Population

The study population target composed all households in Funyula Constituency where a total of 123 household heads with the sample comprising both male and female residents benefiting from CDF targeted to participate in watershed management. Only the research subjects who met the criteria were interviewed during this study;

3.3.1 Inclusion Criteria

- Household head in the study area willing to participate in the study.
- Agencies providing or which had provided environmental or natural resource management extension services in the study area.
- Provincial administration representatives in the study area.
- Representatives from community based watershed conservation and water user groups.

3.4 Sample Size and Sampling Procedure

3.4.1 Sampling Procedure

The research sites for this study were selected through simple random sampling of the seven locations in Funyula Constituency. Three out of the seven locations in Funyula constituency namely; Nambuku, Namboboto and Odiado were selected for this study using simple random sampling design. Thereafter, in each of the three locations, one sub-location was randomly chosen resulting into the choice of Kabwodo, Nyakhobi and Mango sub- locations in Odiado, Namboboto and Nambuku locations respectively (Mugenda and Mugenda, 1999). Thereafter, purposive sampling was used to select one village from each sub-location that was found in each sub category in order to cover different levels of hydrological unit. Bumwoni, Nang'ining'ini, and Sidonge villages were selected from Kabwodo, Nyakhobi, and Mango sub-locations respectively. Bumwoni, Nang'ining'ini and Sidonge are in highland, middle land and lowland sub categories of the watershed respectively.

Sample frame obtained from the respective Chiefs indicated that Bumwoni, Nang'ining'ini and Sidonge villages had 58, 60 and 62 number of households in each village respectively. At least 41 households from each of the three villages were randomly selected for household interviews taking into account the variances in sub-populations (Israel, 1992) within the three villages as following sample size calculation procedure in section, 3.4.2.

3.4.2 Sample Size

The appropriate sample size for this study was calculated from lists with the number of all households in each location per village obtained at the respective chief's offices within the constituency. The lists gave a total of 180 households in the three villages Bumwoni, Nang'ining'ini and Sidonge villages. Yamame (1967) simplified formula for small population sample size calculation was adopted for the study. The formula states:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = the desired sample size

N= Population of households in the watershed 180

e = Margin of error 5 %

From the formula: n = 123

$$\frac{180}{1 + 180\ (0.05)^2}$$

This study further benefited on information solicited from eight purposively selected key informants, who included; local leaders, the District Agricultural Officer and Water Officer, CDF Office Manager, Provincial Administration, civil society leader within Funyula Constituency. The information from the key informants was instrumental particularly in triangulating information provided by the interviewed households.

3.5 Data Collection Methods

This study used both qualitative and quantitative methods of data collection to achieve its objectives: Participatory community mapping, transect walk, photography, questionnaires, interview guide, and observation checklist were tools used to gather information.

3.5.1 Pre-test of Data Collection Instruments

The pre-test subjects comprised at least 10% of the total sample size. The pre-test was carried out one week to the actual study period at Bukhwamba village, Namboboto location. The instruments were then reviewed to capture changes emanated from the pre-test. Issues such as the length of the tool, time to be spent on each tool and interpretation of the tools to local language where applicable were addressed.

3.5.2 Participatory Community Mapping

This gave a visual representation of what the community perceives as their community space in Nambuku location. The purpose of the participatory community mapping was to locate watershed resources, activities, challenges, ecological information, as the water status, general relief features and drainage features Plates 1(a) and 1(b). The alternative objective was to develop study area profile by mapping the CDF projects, watershed resources, infrastructures, social services and land use system areas that the community felt CDF was affecting the biophysical environment. Eight women community representatives with four men and the researcher drew the sketch map on the mud wall of a semi permanent material chosen by community members themselves, and then transferred by the researcher onto paper with all the details provided by the community.

Community institutions necessary for watershed management were identified. The map was also used to draw the transect route (Appendix II).

	
Plate 1(a): *Community representatives drawing a PRA map on a mud wall.*	***Plate 3(b):*** *Watershed systems that the community drew on a PRA map*
Comment: *PRA mapping was used to help the community identify key issues in watershed management.*	

3.5.3 Transect Walk

The researcher was guided by two community representatives through the transect walk from Nambuku shopping centre to Sidonge in Nambuku location. The target during the transect walk was to cover the highland, middle land and lowland topography to identify key issues on the study objectives. People encountered along the route were interviewed to give meaning and context to issues already identified in the participatory community map, and provide information on other observed conditions. Informal interviews were conducted with people encountered along the route and focused on observed phenomena. Field notes were compiled by the researcher and critical issues investigated using technical data sources (Appendix II).

3.5.4 Photography

This was extensively used in the study to capture visual images of relevant impacts of CDF on the biophysical environment, how people benefited from the natural resources and how human activities contributed to watershed degradation. These images complemented observed information instrumental in ascertaining the necessity of utilizing CDF in watershed management (Plates 1(a)-9(b)).

3.5.5 Administration of Questionnaires

Questionnaires with both open-ended and closed-ended questions were administered to the willing sampled household heads in the three sampled villages (Appendix V). A total of 123 questionnaires were successfully administered and returned. Information on socio-economic and demographic, effects of CDF activities on biophysical environment, relevance of community institutions in watershed management, challenges, opportunities and perception of community members on CDF projects and watershed management were collected.

3.5.6 Interview Guide

An interview guide (Appendix IV) was used to collect data from the eight key informants. Information on the amount of CDF allocated to the constituency, factors that determine the allocations of CDF to various community development projects, the role of CDF in watershed management, challenges of using CDF in watershed management were collected.

3.5.7 Observation checklist

Observation checklist (Appendix III) was used to solicit on-site information on CDF projects and watershed management activities. In addition, information on status of the impact of CDF projects on the biophysical environment in Funyula Constituency was collected.

3.6 Data Analysis Methods

The analysis of quantitative and qualitative data in form of verbal statements, photographs, situation contexts and participatory mapping generated by this study was done concurrently since the information solicited from the research subjects were expected to complement each other. Statistical Package for Social Sciences (SPSS) and Microsoft Excel spreadsheet were used to analyse quantitative data. Descriptive statistics such as percentages and frequencies were explored during analysis of the quantitative data using SPSS. Correlations were also used in analysis of the factors influencing watershed management activities in CDF projects. Coded perceptions of the community towards CDF and watershed management were measured and presented in a five point likert scale. Context analysis formed the basis of analyzing qualitative data. Verbatim information obtained from government officials and other key informants were documented. The discussions were presented in form of ratios, tables, figures, and plates.

3.7 Research Ethics and Informed Consent

The permission to carry out the study in Funyula Constituency was granted by the District Commissioner (Appendix VI) who authorised the District Officer, the respective Chiefs, and the community and district line ministries officers including CDF officers to provide the needed information. The researcher explained the objectives of the study, how the study sought to contribute to the general welfare of the community, the roles of each respondent, how confidentiality was to be observed by all respondents who participated in the study. Each respondent was informed that participation in the study was voluntary.

CHAPTER FOUR : RESULTS AND DISCUSSIONS

4.1 Overview

This chapter presents and discusses the findings of the study on watershed management for Sustainable Constituency Development Fund projects in Funyula Constituency. The relative importance of factors that influence the allocation of CDF for community development projects were determined; assesses how the local bio-physical environment has been affected by Constituency Development Fund projects activities; establish the relevant community institutions and organizations to enhance watershed management activities in CDF projects and determines the community perceptions and opportunities for enhancing watershed management activities in the CDF projects. Findings from a sample of 123 households, PRAs and interviews from eight knowledgeable key informants including service providers such as agricultural officer, district water officer, chief, CDF manager, assistant chief, and elders from the constituency are presented. Interviews findings with key government officials were also presented.

4.2 Socio –Economic and Demographic Characteristics of Respondents

Although the sampling of the 123 household heads was done, all respondents voluntarily participated in the study, by gender, 64.2% of the respondents were males while 35.8% were females. Mixed farming with both on farm and off farm activities was the main form of occupation of the more than three quarters (93.5%) of total household heads in Funyula Constituency. This percentage has increased from the previous study which indicated that 78.7% of the households in Funyula were farmers (Aloo, 1993). Farmers who earned salaries comprised only 4.9% of the total respondents while the remaining

were entrepreneurs as presented in Table 4.1. Crop production is majorly for subsistence purpose, making the nature of farming be of low input level, where by local seed varieties are used by about 80% of the farmers (R.o.K, 2007b).

Table 4.1: Socio-economic and Demographic Characteristics of the Household Respondents n= 123

Characteristics	Description	n	%
Household head	Male	79	64.2
	Female	44	35.8
Watershed area	High land	23	18.7
	Middle land	68	55.3
	Lowland	32	26.0
Main occupation	Mixed farming	115	93.5
	Salaried employees	6	4.9
	Entrepreneurship	2	1.6
Income range	< 1500	74	60.2
	1500-2500	29	23.5
	2500-5000	7	5.7
	5000>	13	10.6

Source: Author, 2010

Further analysis from the study indicated that 91.1% of the respondents received their monthly income from all farm activities, out of which 66.9% earned less than Kshs. 1,500 per month. While on average 3.6% of the respondents who earned their income from all farm activities earned above Kshs.5, 000 per month. Further, 4.9% of the households received their income from salaried employment; entrepreneurship was the source of

income to only 1.6% of the households while 2.4% pensions and remittances were their main source of monthly income. Previous report from the government indicated that agriculture contributed 35.4% to household income and employed 81.1% of the residents of Funyula Constituency, 65.99% of the residents lived under one dollar per day (absolute poverty) that contributes 2.43% to national poverty with an average household income of Kshs. 1,239 (R.o.K, 2008d).

4.3 Allocation of CDF to Development Projects

The first objective was to determine the relative importance of factors that influence the allocation of CDF for community development projects in Funyula Constituency. This objective was based on previous studies having shown that after the inception of CDF mechanism in Kenya as a strategy to eradicate poverty and ensure equitable distribution of government resources there is still public outcry (UNDP, 2006) that CDF has not helped communities reduce poverty. At the same time watershed management approaches are not factored in decision making despite increasing evidence that investment in ecosystem conservation, such as watershed management, results in increased income for the rural poor (UNEP,2007).

4.3.1 Trends of CDF Allocated to Funyula Constituency

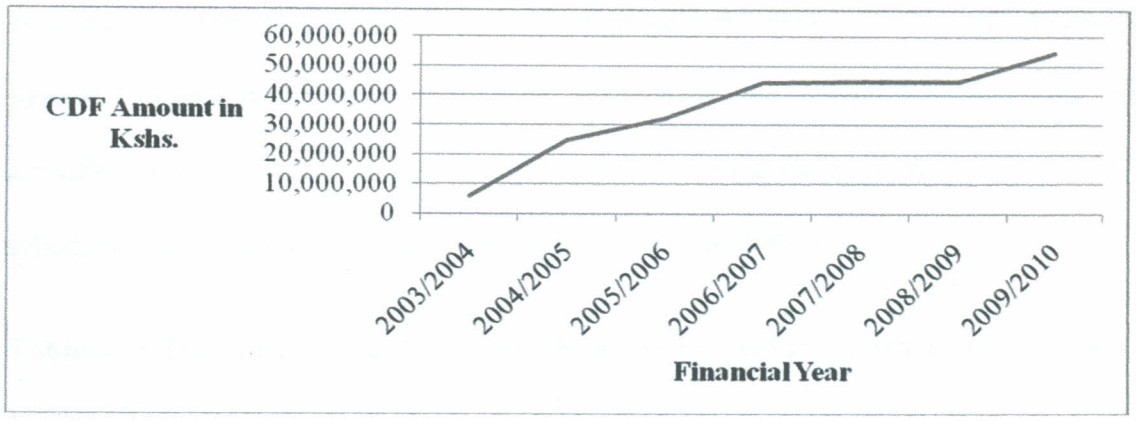
Table 4.2 and Figure 4.1 findings of an analysis from the CDF board records indicated that there was been an increase in the amount of taxpayers' money allocated to the CDF in Funyula Constituency from Kshs. 6,000,000 in the financial year 2003-2004 to Kshs. 54,335,669 in the financial year 2009-2010. This increase was due to the need by the government to meet Millennium Development Goals (MDGs) and to attain development

targets as prioritized in Economic Recovery Strategy for Wealth and Employment Creation (ERS) 2003-2007. Priority programmes focussed on poverty reduction, social and income inequality through employment and empowerment, improving access to basic social services, inputs and opportunities to all, irrespective of gender and region (R.o.K, 2009). As a result, CDF projects have increased leading to increased utilization of biophysical environmental resources such as water springs, dams, roads, quarries, trees among others in the constituency.

Table 4.2: CDF Allocated to Funyula Development Project from 2003/04-2009/10

Year Number	Financial Year	CDF Amount Allocated
1.	2003/2004	6,000,000
2.	2004/2005	24,691,353
3.	2005/2006	31,933,383
4.	2006/2007	44,237,827
5.	2007/2008	44,511,064
6.	2008/2009	44,511,064
7.	2009/2010	54,335,669

Source: Author, 2010; Analysis from CDF Board records



Source: Author, 2010; Analysis from CDF Board records

Figure 4.1: Trends of CDF Allocated to Development Projects in Funyula Constituency

At the national level, CDF allocations to respective constituencies are guided by the formula: CDF Allocation = (0.75 by CDF) divide by 210) + (0.25 by CDF) by WCP) where CDF is the total allocation less (3% administration costs + 5% for emergency) WCP is the constituency contribution to national poverty (Gikonyo, 2008). The allocation rationale is supposed to contribute to the long term development goals contained in Kenya's Vision 2030 plan. As indicated in the formula, high poverty levels in Funyula Constituency contributed to increase in the amount of CDF allocation.

4.3.2 Types of Development Projects Funded by CDF in Funyula Constituency

Table 4.3 presents the types of CDF projects that are likely to impact on the watershed systems in Funyula Constituency in the financial years running form 2003/04 to 2008/09. These projects mainly included construction type that utilized materials from the local biophysical environment. Education sector had the highest number 55 projects. In all the financial years, education sector was allocated the biggest portion of the CDF funds

available. In 2006/07 financial year, more than half (57.08%) of CDF was allocated to education sector alone. Construction of classrooms and dormitories were the main activities aimed at reducing students' congestion and increasing enrolment rates in the schools in the constituency in support of Free Education Policy.

Table 4.3: Type of Projects Funded in Funyula Constituency from 2003/04-2008/09 Financial years.

Type of Project	Number of projects	Financial Years and Percentage (%) Financial Allocation					
		2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Education	55	1.25	31.18	19.04	57.08	80.11	18.01
Health	7	1.67	18.46	9.19	21.32	8.41	3.14
Water	13	1.25	9.84	3.59	2.24	11.32	1.99
Roads and bridges	1	0.83	0.4	0.6	0	0	0
Energy	7	0	0	0	0	0	5.09
Sports	1	3.3	3.25	1.66	1.54	0	0
Law and security	1	0	3.39	7.99	4.5	0	0
Environment	1	0	0	0	0	0	1.99

Source: Author, 2010; Analysis from CDF Board records

Health sector had seven CDF funded projects which included construction of health facilities to increase accessibility to health care. Water sector had thirteen projects which included drilling of boreholes, rehabilitation of dams, springs and piped water. The projects in water sector were aimed at providing safe and clean water. In the financial years under review 2003/04 to 2008/09, there were no projects for water catchment areas conservation and management. Grading of roads and construction of bridges had only one project allocated finances, while energy sector had seven projects. Environmental projects were allocated 1.99% of the CDF available in the 2008/09 financial year, but during the time of the study, there was no project on the ground in the environmental sector.

The amended CDF Act of 2007 requires that 'Environmental activities may be considered as development projects for purposes of the Act provided that the allocation to such activities does not exceed two per centum of the total allocation of the constituency in that financial year. End Term Review of Economic Recovery Strategy (ERS) (2009), recognises that economic development of Kenya largely depends on natural resources. Hence, the effective management of natural resources is critical in fostering sustainable development (R.o.K, 2009). However, the trends in allocation of CDF in Funyula Constituency to environment sector seemed not to address the sustainable development needs.

In addition, the inter-relationship between the sectors was not observed in the fund allocation rationale. For example, for effective communities' participation in education the students must get good nutrition which contributes to good health, more so time spent to access water and fuel wood contributes to time spent on education especially in rural communities.

4.3.3 Factors Influencing the Allocation of CDF to Community Projects

The spirit of CDF is that the community is supposed to utilize the money in development projects basing on the provision in the CDF Act with community participation in projects decision making process as per the guideline. However, according to Funyula Constituency CDF manager during an interview held in May, 2010 at Funyula Constituency CDF offices, it was evident that proposals as required by CDF Act of 2007 received at constituency level from location level, community forums all over the constituency indicated that local socio-economic factors influenced how CDF was

allocated to various community development projects in Funyula Constituency. The most important of these factors according to Funyula Constituency CDF manager included;

a) Poor Educational and Health Facilities/ Infrastructure

Before inception of CDF projects, Funyula Constituency had poor educational and health facilities/ infrastructure that influenced school performance, enrolment rate and access to health care. Therefore, according to the Funyula Constituency CDF Manager, in CDF committees at the location level, the communities requested CDF to finance education and health facilities / infrastructure to improve service delivery in these two key sectors to social development. These local priorities contributed to the overall national target as outlined in the ERS of provision of Universal Primary Education (UPE) and reducing the disparities in access and quality of education (R.o.K, 2009). These goals are in line with the Millennium Development Goals (MDGs) which calls for the attainment of Universal Primary Education by the year 2015 as well as the promotion of gender equality and empowerment of women. Prioritization of projects in Funyula Constituency health sector using CDF was to enhance accessibility and affordability of quality basic health services to people with special emphasis on the vulnerable and poor people. In the End Term Review of ERS, it was reported that through the CDF, 1000 health facilities were constructed to increase access especially in the underserved areas (*Ibid*).

b) Poor Road Networks

According to the Funyula Constituency CDF manager, rough terrain, rocky hills with numerous streams running from the hill tops to the River Sio negatively affected the road network in the constituency. Location CDF committees had submitted in previous years proposals to either rehabilitate existing degraded roads or opening up other roads to make the area accessible. This called for more financial resources for building bridges and grading the roads. Each year after the rainy seasons roads were terribly damaged and the only help available was to allocate CDF to rehabilitate the roads network.

c) Access to Clean and Safe Water

According to Samia District Water Officer, access to clean and safe water for the residents of Funyula Constituency was a challenge. Though the constituency had numerous springs and dams, location committees requested CDFC to fund projects in water sector. Constituency Development Funds were used to rehabilitate water sources and ensure that the residents had access to clean and safe drinking water. This was in response to community demand as proposed in the proposals from various locations. In the End Term Review of ERS, it was reported that devolved funds such as the CDF could be used to implement small-scale community projects such as spring protection, shallow wells, and boreholes while ministry should concentrate on larger projects (R.o.K, 2009).

CDF projects have played important role in improving people's livelihoods by providing essential services in education, health, water, roads, energy, sports, law and security. Decision making on the allocation of CDF to community development project was

largely influenced by local socio-economic factors without the consideration of the effects of increased unsustainable utilization of biophysical resources as well as the contribution of watershed management activities to poverty reduction. According to KARI and ICRA (2006), the low impact of CDF and other environmental development projects in Kenya is due to wrong priority in project funding. Watershed degradation is a major threat to land productivity and food production, investment in ecosystem conservation, such as watershed management, results in increased income for the rural poor (UNEP, 2007).

4.3.4 Contribution of Watersheds to Local Community Livelihoods

The study findings shows that majority of the people in Funyula Constituency depended on watersheds services , 92.7% on fuel wood, 97.6% on farmland, 87.8% on timber, posts, rafters, 87% on medicinal herbs, 87.8% on grazing field and fodder; 87% on soil conservation, 94.3% on water provision; and 87.8% on biodiversity maintenance among other services identified by the respondents. Forest in particular, provide consumable products such as timber, poles, and posts, and fuel for the majority of Kenyans. Forests also contribute to the preservation of the environment (R.o.K, 2009). The hills were valued as a source of wood for making charcoal, building materials in form of grass, poles, and stones as shown in Plate 2(a), 2(b), 3(a) and 3(b) that present contributions of a healthy watershed to community livelihoods in Funyula Constituency.

Plate 2(a): *Women carrying fuel wood*

Plate 2(b):*A woman harvesting cassava*

Comment: *Funyula Constituency depend on fuel wood and food from a watershed*

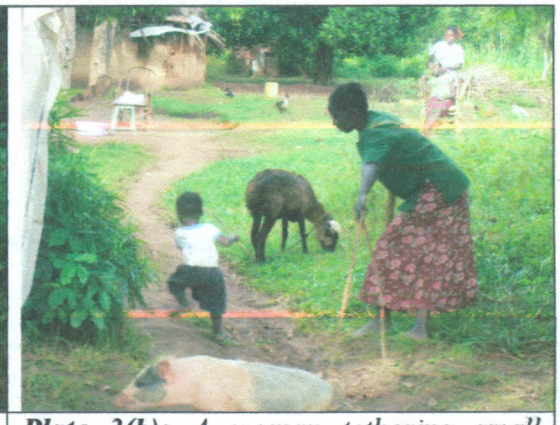


Plate 3(a): *A woman harvesting vegetable from farm land*

Plate 3(b): *A woman tethering small ruminant in the homestead*

Comment: *Funyula Constituency depend biophysical environment for mixed farming activities*

During the interview one of the district service providers had the following to say;

"CDF is good at putting up visible structures. No activities in watershed management, they build schools and hospitals, open up the roads. They should also plant trees and engage in other watershed management activities to increase food production for the people"

Source: District Deputy Agricultural Officer, Samia District, 2010

The poor entirely depend critically on fertile soils, clean water and healthy ecosystems for their livelihoods and well-being. This reliance creates complex, dynamic interactions between environmental conditions, communities' access to and control over environmental resources, and poverty. Understanding the nature of these relationships is a prerequisite for enduring success in the fight against poverty (Kimaru *et al*, 2006).

4.4 Effects of CDF Projects on the Communities' Bio-physical Environment

The second objective in this study sought to assess how the communities' bio-physical environment has been affected by CDF projects activities. In determining this objective, biophysical environment was stratified into three subsections; the highland, the middle lands and the lowlands sections of a hydrological unit. Photographs were taken in various locations where CDF activities have directly impacted on Funyula Constituency bio-physical environment.

4.4.1 Effects of CDF Activities on the Highland Biophysical Environment

The study found out that, 70% of the respondents had knowledge of CDF activities having negative impacts on biophysical environment. These effects included;

a) Abandoned and New Quarries in the Highlands

Findings indicated that quarrying was the main activity that had intensified in the highland sections of the watershed due to increased CDF infrastructure development projects. Quarries which are spread all over the hills provided building stone. A good example is at Nambuku shopping centre near the dispensary; Nairobi and wide spread on the hillsides as shown in Plate 4(a) and 4(b). The quarries were left open with underground-stony soils unfit for farming activities. This led to dereliction on the

watershed because the quarries were not rehabilitated after extraction of building stones. Families with quarries in their farmlands found it difficult to cultivate crops thereby affecting their livelihood. Such families mainly practiced quarrying to raise income in short-term. Quarrying is not viable as a long term economic activity for the households.

Plate 4(a): *Quarry adjacent to Nambuku Dispensary CDF project*

Plate 4(b): *Nambuku Dispensary CDF project under construction*

Comment: *Construction material such as building stones, timber, sand and water obtained locally and construction space vegetation is cleared to give building space.*

In Plate 4(a), quarrying was done 100 meters from the CDF project on the hillside. The interview with the Funyula Constituency CDF Manager revealed that most of the quarries and brick making holes were not rehabilitated after use. The manager said:

> *"Quarrying, sand harvesting and brick making are done on private lands. Therefore, the land owners cannot allow CDF to rehabilitate them. However, the brick making holes and quarries can be useful in rain water harvesting and irrigation hence protecting the catchment areas."*
>
> Source: CDF Office Manager, Funyula Constituency, 2010

This impacted negatively on the community, in some cases reptiles such as snakes and wild animals inhabited the quarries and affect people movements during rainy seasons,

domestic animals and children could drown in abandoned quarry site which also becoming mosquitoes breeding sites.

b) Cutting Down of Trees for Construction

The study also found out that intensified CDF projects activities in the area had greatly negatively affected forest resources in the highland part of the watershed; this was mainly through cutting down of trees to provide timber and poles for constructions. Local suppliers tend to look for cheap locally available timber from the community to avoid extra transportation costs and to provide locals with income. The problem is that communities cut trees but they do not replant thereby affecting the watershed negatively. The activity of cutting down trees without replacing is likely to expose the highlands areas to wind, rain erosions and high evaporation rates. This was evidenced by silting at Ludacho and Mumbao streams. Brick making uses a lot of fuel wood, construction of police posts, schools, roads, health centres among others leads to clearance of forest ecosystems and other vegetation to create room for construction site.

c) Grading of Weathered Roads

Funyula Constituency has only one tarmac road that is from Bumala to Port Victoria. Others roads are graded weathered roads that including; Matayos –Nangina, Nambuku-Lugala- Buradi, Nambuku-Busibi-Sidonge-Buradi Busibi- Funyula roads, among others. These roads have enormous negative effect on the watershed management. The roads are graded without proper runoff management barriers exposing the soil to wind and water erosions (Plate 5(a) and 5(b). Murram used for levelling roads was dug on road sides and in some places next to schools as shown in Plate 5(b) without considering the long term impacts of the site such as drowning of schools children and animals during the rain

seasons. Poor management of runoff combined with poor soil management in farms along the roads accelerated soil erosion leaving farms barren. In some road sections, gullies were visible and streams siltation. For example, Ludacho and Mumbao bridges, along Matayos- Nangina road. This has left most farms along the road more bare reducing crop yields. When Funyula Constituency CDF manager was asked if any feasibility study or environmental impact assessment was done for the roads project, the response was that CDF did not carry out the study once the community had prioritized a particular project it was enough that the project was viable to the environment and the community. This meant that the requirements in EMCA (1999) were not being followed.

Plate 5(a): *Graded road and electricity line CDF project.*

Plate 5(b): *Murram site where materials for levelling graded roads was drawn.*

Comment: *Heighten the demand for land and clearing tall trees to create space for power line thereby exerting further pressure on biophysical environment*

To some extent the runoff was directed to individual farms, destroying farmland and crops making farmers vulnerable to hunger. Land uses, especially roads and footpaths, which occupy small areas of land, account for large percentages of total erosion (Ziegler *et al.*, 2001). Thus proper watershed management and planning is needed to minimize the negative effects of CDF road projects on the biophysical environment.

During a personal interview with Funyula Constituency CDF Manager, the major challenge to road grading in the area was private land ownership;

> *"The main challenge CDF is facing is private owned lands, hills and water areas. We plan to give our roads good drainage systems, but the problem is that farmers do not allow drainage to pass through their farms".*
>
> Source: CDF Office Manager, Funyula Constituency, 2010

4.4.2 Effects of CDF Projects on the Middle Land Biophysical Environment

a) Clearing of Vegetation for Electricity Line Construction

Clearing of vegetation to open space for electricity line construction along Matayos-Nangina, Nambuku- Lugala- Buradi, and Nambuku-Busibi roads among other areas had a lot of negative effects on the middle land biophysical environment. All tall trees were cut down and other vegetation cover destroyed to open up for the erection of the electricity line in Plate 5(a) and 5(b). Unfortunately, these trees were not replanted, thus enough evidence that the community and the contractor had no information on the EMCA (1999) requirement of carrying out environmental impact assessment of the project with such effects on the environment before implementation. Trees which acted as wind breakers and source of fruits such as mangoes trees especially during the drought seasons were cut down. Homesteads were exposed to the effects of strong wind which threaten blowing away roofs of the houses. The District Environment Officer was never consulted according to the interviews with Funyula Constituency CDF Manager, an indication that much was happening in the environmental sector without the approval of the District Environmental Officer.

b) Abandoned and Active Brick Making Sites

Brick making was another activity that CDF projects had intensified in the middle land area of the watershed. Bricks for building CDF projects such as schools and health facilities were obtained locally in the area. Brick making was done along streams with fertile clay soil near water sources. Wet land ecosystems were cleared to give room for bricking making sites. Firewood used for baking bricks was locally available from the hills or using thorny trees found in wetlands. Brick making holes were never rehabilitated, leaving the soils unfit for farming activities. Good soils for crop production were destroyed reducing crop yields in the area while reptiles including snakes inhabited the holes thereby negatively affecting community's activities. However, the district water officer observed that:

> *"Most water catchments are in privately owned lands therefore using CDF would be quite difficult unless it targets individuals. However, brick making holes and quarries can be used for water harvesting which increases water retention thereby reducing soil erosion."*
>
> Source: District Water Officer, Samia District, 2010

Further, the district agricultural officer had the following to say;

> *"Road runoff, brick making holes, quarries and sand harvesting on the scarce land communities leads soil erosion since farmers do not have capacity and knowledge to reclaim the land".*
>
> Sources: District Agricultural Officer, Samia District, 2010

c) Rehabilitation of Dams

According to Funyula Constituency CDF Manager, CDF in partnership with UNICEF had renovated dams in Funyula Constituency. Matinga and Ganga dams were completed while Namboboto and Bwiri dams' completion was underway in Plates 6(a) and 6(b). There were no environmental impact assessment reports for these activities during the time of the study. The projects had increased water availability for both livestock and human use in the constituency. However, there were no conservation efforts done to reclaim hills which were the main catchment areas. He also noted that CDF projects had only utilized the biophysical environment in the past, but there were plans to plant trees in all the twenty nine springs in the constituency to ensure that the catchment areas were protected.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Plate 6(a): Namboboto dam being renovated using CDF in partnership with UNICEF</td><td>Plate 6(b): Namboboto dam being renovated using CDF in partnership with UNICEF</td></tr>
<tr><td colspan="2">Comment: Dam rehabilitated to conserving water source upstream not rehabilitated</td></tr>
</table>

d) Fish Pond Project

Constituency Development Fund fish pond project was initiated in the constituency to boost food security; the projects were set up along streams which were not previously utilized, therefore fish ponds were spread all over the streams. Farmers were encouraged to utilize the same water for irrigation, horticulture and vegetable gardens were practised according to Funyula Constituency CDF Manager in Plates 7(a) and 7(b).

	
Plate 7(a): *Fish pond CDF project*	***Plate 7(b):*** *Wetland utilized for vegetable growing*
Comment: *Wetlands have been utilized to provide goods but not conserved by CDF.*	

Farm ponds are important in any watershed management programme. Ponds are useful in storing water for irrigation and also retard sediment and flood flows to the downstream river system, therefore farm ponds contribute to food security and environmental management whereby the two are the main challenges facing humanity in the twenty-first century (Lal, 2000) including people in Funyula Constituency. Therefore, protecting and strengthening watershed ecosystems to provide services is one of the main strategies to address these two issues. Land and water degradation threaten food security for many of the poorest and most food insecure living in Africa (Kaiser, 2004). It also contributes to persistent

poverty, and results in decreasing ecosystem resilience and provision of environmental services (Costanza *et al.*, 1997).

e) Springs Protection and Drilling of Water Boreholes

Constituency Development Fund had been utilized in the construction of twenty nine springs (water points) in Funyula Constituency. The projects had helped the community access water. For example, construction of Murondo spring in Plate 8(a) and 8(b) at a cost of Kshs. 500,000 from CDF and drilling of several boreholes such as Muhombe borehole and Mundaya in the study area was a good example.

Plate 8(a): *Rehabilitated Murondo spring*

Plate 8(b): *Namboboto borehole*

Comment: *CDF has been utilized to provide water services which further pressure on biophysical environment*

However, in some places like Muhombe area where there were more than two boreholes at a distance of less than 300 meters was not good for underground water management. Environmental Impact Assessment was not done to all springs and borehole projects showing that watershed management approaches were not considered when making decisions dealing with CDF projects. This contributed to ERS objective of utilizing CDF to finance small scale water projects throughout the country (R.o.K, 2009).

f) Rain Water Harvesting

The study showed that CDFC had recognized the importance of harvesting rain water in schools. Thereby, allocating some money to rain water harvesting as the CDF manager revealed;

> *"CDF has donated water tanks with a capacity of 10,000 litres each, to all institutions in Funyula constituency. This is aimed at harvesting rain water which should be used for tree nurseries. The institutions are supposed to sell the seedlings to the neighbourhoods therefore, increasing the supply of seedlings in the communities at a low price. The water is also supposed to improve the hygiene in the schools thereby cutting down on waterborne diseases".*
>
> Source: CDF Office Manager, Funyula Constituency, 2010

This is a best practice in integration of watershed management approaches in CDF. Rain water harvesting is an important aspect in the management of any watershed system. Soil erosion is controlled.

4.4.3 Effects of CDF Projects Activities on Lowland Biophysical Environment

a) Sand Harvesting

During the transect walk, findings show that sand used in CDF construction projects, was drawn from River Sio at Sidonge. Inquiries from the youths involved in harvesting sand at Sidonge revealed that CDF projects had impacted positively on their job creation business and youth were happy that CDF projects provided them a steady market for harvested sand with the returns improving their livelihoods. However, some youths the researcher talked to indicated that, they are yet to see the fruits of CDF funds in conserving watersheds and that they were not involved in any watershed management decision making process. In addition, sand harvesting destroyed riparian biodiversity

such as fish and bird habitat compromising on the livelihoods of the community which over the years during rainy season enjoyed plenty of fish as a result of floods. It is difficult for the community to adopt the conservation effort proposed without proper structures in place for community participation. To remedy the situation, a combination of skills are necessary for watershed management that considers the interaction in time and space not only of individual plots but also of the common pool resources such as forests, springs, gullies, roads and footpaths, and vegetative strips along rivers and streams (Swallow *et al.*, 2000).

4.5 Community Institutions and Organizations

The third objective in this study sought to establish relevant community institutions and organizations to enhance watershed management activities in CDF projects. To ascertain this; the households and the key informants provided information regarding their involvement in watershed management activities through groups. They also ranked the social groups that they felt could be useful in utilizing CDF in watershed management activities.

4.5.1 Community Involvement in Watershed Management Groups

Findings indicated that 40.7% of the respondents were members of watershed user groups. Whereby 95.1% agreed that membership to watershed user groups enhanced their skills in watershed management. In addition, 44.7% of members in groups had joined the groups to gain access to water, 19.5% to gain access to credits, 17.8% to get training on watershed management while, 4.1% to contribute to collective action by the community in watershed management. From informal interviews with elders, each clan in Funyula

Constituency had its own welfare association which had responsibilities to manage the clan's socio-economic welfare such as funerals and education. *Wekhonye* and *Busibi* Child Care Community based organizations were examples of watershed user groups in the area. The study established that tree nursery management, tree planting techniques, forest fire management, watershed activities monitoring and reporting, soil management techniques were activities that the groups offered to their members.

Findings in Table 4.4 show that only 18.7% of the respondent members to watershed management groups were not satisfied with services offered in groups. Inefficiency in service provision was identified by 26.8% of the respondents as the reason, while 13.0% indicated inactive members in groups. While 27.6% of the sampled household felt that CDF can be helpful in watershed management by providing watershed management trainings, 23.6% felt that introducing demonstration projects in groups using CDF could be the best avenue for communities to learn. On average, 86.2% felt that the government should lead other institutions in watershed management activities. CDF should be used to provide watershed management trainings such as water and soil management geared towards sustainably managing watershed systems.

Table 4.4: Variables for Assessing Performance of Groups in Watershed Management

Variable	Group	Respondents	Percentage(%)
Level of satisfaction with the watershed management services offered in groups	Very satisfied	10	8.1
	Satisfied	19	15.4
	Less satisfied	15	12.2
	Not satisfied	23	18.7
Reasons for not satisfied with groups watershed management activities	Inefficient service provision	33	26.8
	Members not active	16	13.0
	Not interested	15	12.2
	Not sure of the benefits	6	4.9
	No change from members	6	4.9
Watershed management activities the community would like introduced in groups by CDF	Watershed management Training	34	27.6
	Credit facilities	27	21.9
	Watershed research	12	9.8
	Watershed extension services	14	11.4
	Demo projects	29	23.6
	Tree planting on public land	7	5.7
Community feelings on which institution to lead in watershed management activities	Government	106	86.2
	NGOs	64	52.0
	CBOs	38	30.9
	Church groups	17	13.8

Source: Author, 2010

4.5.2 Social Groups and Institutions to be involved in Watershed Management

Table 4.5 indicates that the families at household level were the most ranked by 36.6% as the institution to be targeted by CDF in watershed management activities. Schools, youth groups and religious groups were ranked second, third and fourth by 13.0%, 19.5% and 8.9% of the sampled households respectively. Families are valued by respondents because they are perceived as avenues for socialization and where everybody in society

can be reached in watershed management. At family levels small farm management practised can be used to promote watershed management activities. Women groups were the least ranked by only 4.8% of the respondents. Compared to other institutions and organizations, 16.3% of the respondent ranked CBOs/NGOs as the institutions to be used in watershed management. Though a number of physical, social and cultural factors influence the watershed management, institution understood as a patterned behaviour of social group over a period of time constitute a crosscutting factor and a particular driving force in the decision-making process (Young, 1999).

Table 4.5: Social Groups and Institutions to be utilized in Watershed Management

Institutions	No. of respondents	% of respondents
Family	45	36.6
Religious groups	11	8.9
Schools	16	13.0
CBOs/NGOs	20	16.3
Youth group	24	19.5
Women groups	06	4.8

Source: Author, 2010

*(**Note:** some respondents identified more than one institution)*

Non-Governmental Organisations bridge the gap in community development and contribute to resource mobilization; capacity building, changing community attitudes and saving lives in relief support. In addition, small groups function better and suffer from fewer internal conflicts than village cooperatives (IIRR, 1998). Group extension services, local savings and credits and participatory watershed management research are only but a few of the benefits community can gain from CBOs and NGOs. The CDF manager reported that, partnership with organizations was seen as an opportunity for effective community development. The most successful watershed and catchment management

programmes involve multiple stakeholders – community groups, NGOs, government agencies – a mix of new techniques and social organisation, and give balanced attention to improving resource management and farmers' livelihoods (Kerr *et al.*, 2002).

Findings in Table 4.6 indicate that 55.3% of the respondents are of the view that the institutions using CDF in watershed management activities should target all members in the community without discriminating against gender, age and position held in the community. However, 29.3% felt that only community elders should be targeted, while 33.3% of the respondents felt that the youths should be targeted by the organizations that utilize CDF in watershed management.

Table 4.6: Targeted Individuals in Watershed Management Activities

Targeted individuals	No. of respondents	Percentage (%)
Men	12	9.8
Women	32	26.0
Children	33	26.8
Youths	41	33.3
Community elders	36	29.3
All members	68	55.3

Source: Author, 2010

*(**Note:** some respondents identified more than one individual group)*

The fact that each member in a household is affected or affects activities in watershed, it is necessary that everyone is targeted to ensure sustainability of efforts in watershed management. In the rural areas each person in a family provides labour in farming, therefore, has a role play in watershed management activities. However, the population according to Funyula Constituency CDF Manager did not understand EMCA1999.

4.6 Community Perceptions and Opportunities

The fourth objective sought to determine the community perceptions and opportunities for enhancing watershed management activities in the CDF projects. To address this objective, the study assessed the limiting factors for community's involvement in watershed management, the best practises and capacity in watershed management that CDF could be optimised and promoted with respondents' perceptions towards CDF projects and watershed management approaches.

4.6.1 Environmental Limitations to Watershed Management Activities

a) Weather Related Shocks

Findings indicate that, 98% of the sampled households have experienced weather related shocks in the past one year. Eighty four percent (84%) agreed to have experienced effects of drought, 31% floods and 40% pest infestation. During these shocks, the respondents were left with no alternative but to use unsustainable practises to survive, these included 49% of the respondent bought food, 12% opted to use irrigation to produce crops, and 6% bought fuel while 16% applied pesticides on their farms during pest infestation. At the same time, 12% of the respondents raised income from selling charcoal and fuel wood, 9% sold bricks, while 5% had no option but harvested and sold timber with 6% having to wait for government assistance. During the same period, 4% of the respondents relied on the watershed resources as a source of vegetable. Biodiversity in the marginal watershed systems such as wetlands is lost and community dedicating much time to searching for livelihood means other than engaging themselves in watershed management activities.

b) Community Watershed Management Capacity

Overall, 50% of the respondents have never received any training on sustainable watershed management practises. Those who have received training during farmer's field days were 24.4%, 12.2% from the farmers training centre, 4.9% from extension agents, 8.1% from the media and 6.0% from the cooperative society. A majority, 50% had only been trained once in their lifetime, 48.8% had applied the knowledge gained on their farms and above 50% rating the training as important. However, only 27.6% were satisfied with the training.

The study found out that, 86.1% of the community members accessed watershed management information from public barazas, 63.1% through radio programmes while the newspaper and forest department was the source of watershed management information to 39.3% and 20.3% of the respondents respectively, with 7.4% of the respondents accessing the information through the television. Public barazas are best placed opportunity for CDF to mobilize people and build their capacity on various watershed management approaches. Alternatively, radio, newspaper and Kenya forestry department could be used to reach out to many people. During the interview with the area Senior Chief the following was revealed:

> *"In early 1980s, there was an agreement between the Kenya government and the community on conserving the soils which the community here referred to it as ('agrimiti') meaning agreement. Communities were forced to build terraces referred to as 'fanya juu and fanya chini'. Ditches were dug to control the rain water flow in the shambas. However, this has become historical since farmers are destroying them saying they are blocking runoff therefore, causing water logging in their farms. Some of them say they do not have enough land for such activities.*
>
> Source: Senior Chief, Nambuku Location, 2010

Note: *[Fanya chini fanya juu are bunds in which the bank is above the ditch, promoting natural terrace formation. They are called by their Swahili name, given where they were first used in Kenya's Eastern province.]*

This statement clearly reveals that the communities lacked enough land and knowledge on the best way to conserve watershed, with growing scarcity in farm land that have compelled communities to abandoned watershed management practices.

4.6.2 Socio -economic Limitations to Watershed Management Activities

a) Access to Credit Facilities and Inputs

Over 82.1% of sampled households across all the sub-catchment areas indicated that they had no access to credit and inputs thus limiting their participation in watershed management. However, findings showed that respondents practised farm activities related to watershed management but for other reasons as later revealed. According to Aloo (1993), it is difficult for land owners in Funyula Constituency hills to plant or rehabilitate denuded hilly areas. This is as a result of lack of financial, labour and other resources necessary for conservation in hilly area. In addition, it was established that many farmers lived at subsistence level therefore; they fail to see the importance of watershed conservation. Constituency Development Fund is the best option to enhance community participation in watershed management by providing incentives such as credits and inputs.

b) Watershed Related Conflict

Findings in Table 4.7 indicate that human-wildlife conflict is a problem to 55.9% of the sampled households. However, interview with the Senior Chief Nambuku location revealed that, the most common human- wildlife conflict in the area was from monkeys

destroying farm crops especially for those whose farms are in the hills and wetlands. However, it was illegal for the community to kill monkeys according to the Wildlife Act. Yet agriculture output drops when crops are destroyed by monkeys and during human conflicts when farmers compete for agricultural land among themselves. Likewise, there is competition for grazing land among the livestock-keepers which affected 67.8% of the households that lowers livestock production. Conflict between irrigation agriculture and wildlife conservation is currently considered critical point in watershed management (Lemly *et al.*, 2000) due to the impacts of irrigated agriculture on wetlands and wildlife.

Table 4.7: Conflicts Related to Watershed Resource

Type of conflict	Human-wildlife conflict	Competition for settlement space	Competition for grazing land	Competition for cultivating land
Yes	55.9%	54.2%	67.8 %	71.2%
No	44.1%	45.8%	32.2%	28.8%

Source: Author, 2010

It is important to internalize the comparative strengths of the different stakeholders in order to complement the overall development process by minimizing watershed related conflicts. Similarly, watershed committees at village level, elected institutions at the local level, government departments and NGOs as project implementing agencies, with upstream and downstream inhabitants within the watershed habitats having diverse perceptions and expectations from potential projects that can be a source of conflict. The challenge to stakeholders in watershed management in Funyula Constituency and Kenyan government is to ensure universal but flexible guidelines at higher levels of governance and the necessary flexibility and adaptability at the grassroots level to manage inherent

contradictions and conflicts through adequately designed resolution mechanisms (Sharma, 2001).

c) Limited Community Participation in CDF Projects decision making process

Findings indicated that 99% of the respondents have heard about or had seen a CDF project. Only 1% of them had participated in project identification or implementation, 9% were involved to the extent of receiving information on CDF projects during chief's barazas, while 1% attended CDF stakeholders meetings to discuss specific issues and 1% felt that they were involved in decision-making. This was because the few either belonged to the CDFCs and PMCs, the committees which overall manages the fund and projects at the constituency level or the grassroots level. Therefore, limited community participation in CDF projects decision making process is a limiting factor in the consideration of watershed management approaches in CDF projects as supported by the statement below;

> *"CDF operates on a demand driven principle, we only allocate funds for what the community has requested for. Therefore, what we need to do first is to capacity build our people on the different needs in the community and how they can write proposal to demand for watershed management projects".*
>
> Source: CDF Office Manager, Funyula Constituency, 2010

However, CDF projects are characterised by lack of professionals in several CDF committees and limited community participation in many constituencies across the country (R.o.K, 2008a), therefore, limited involvement of all stakeholders decision making process of CDF projects leads to lack of ownership. However, the CDF manager assumed that once the two committees are appointed from the community, it was sufficient to represent the community in decision making as evidenced by the statement below;

"We have CDF committee representatives at the location level and sub-location level. They are in charge of determining community needs and forward the proposals to the constituency level for approval. Therefore, I believe that everybody in Funyula is well represented. In addition, after the project has been approved, the Project Management Committee (PMC) is selected from the community in which the projects belong. PMC is in charge of project implementation and monitoring, overall management of all financial and non financial resources. My only concern is that the committees lack watershed management experts to guide lead them in proposals development"

Source: CDF Office Manager Funyula Constituency, 2010

d) Neighbourhood Interference and Community Resistance

According to 19.5% of the respondents, interference from their neighbours was the major challenge for their involvement in watershed management. Political interference was a challenge to utilizing CDF in watershed management activities as pointed out by 7.3% of the respondents. Earlier in 1969, the government encouraged the stakeholders working in the area to plant trees, when the forest department negotiated for afforestation of Samia Hills (R.o.K, 1989). At that time the department wanted to replace the indigenous vegetation on the hills with eucalyptus, cypress, and pines trees. However, the people in the area effectively prevented the government from acquiring their hilly lands. The community burnt the trees the government had planted and eventually, the government gave up. The community would have lost its traditional dry season grazing lands, fuel wood sources and sources of medicinal herbs and other minor bush products. In addition, farmers downhill now face runoff and soil erosion from sources over which they have no longer control (Aloo, 1993). It seemed that the community was not involved in decision making process:

"The Provincial Administration led by the Busia District Commission in 1995 came and we planted trees all over the hills in this area. I and my people were involved. However, at night, the owners of the hill uprooted all the trees. I did not know why? But I feel they were not educated before and they felt that the government will take away their land"

Source: Senior Chief, Nambuku location, 2010

The above comment is not surprising since it had happened previously, to ensure this is not repeated. Decentralised strategies such as CDF can make people be aware of potential benefits of collective action in conserving and managing natural resources, demand driven activities in watershed programs, empowering people in planning, implementing and managing watershed management programs and expecting high private economic benefits (Joshi *et al.*, 2000). The correlation analysis for variables identified was done with the results presented in Table 4.8.

Table 4.8: Pearson's Correlation Coefficient(r) values of selected variables

	Practised watershed management	Lack of credit/ inputs	Lack of knowledge	Land constraint	High start up cost	Interference from neighbours	Political interference
Practised watershed management	**1**						
Lack of credit / inputs	**-0.106**	**1**					
Lack of knowledge	**0.013**	**0.107**	**1**				
Land constraint	**-0.026**	**0.322****	**0.093**	**1**			
High start up cost	**-0.32**	**-0.022**	**0.128**	**0.090**	**1**		
Interference from neighbours	**-0.079**	**-0.038**	**-0.086**	**0.142**	**-0.263****	**1**	
Political interference	**0.064**	**-0.032**	**-0.149**	**0.097**	**-0.181***	**0.019**	**1**

*= r values significant at p< 0.05 level (2- tailed) n=123

**= r values significant at p< 0.01 level (2- tailed) Source: Author, 2010

Findings in Table 4.8 reveal that there is a strong negative correlation between lack of credit/inputs and households' participation in watershed management for last two years ($r=-0.106$, $n=123$, $p< 0.05$). Therefore, lack of credit/inputs in Funyula Constituency did not have any effect on the community watershed management activities. This is because households practised related watershed management activities but for other benefits such as food, shelter and cash. However, there is a positive correlation between lack of watershed knowledge and participation in watershed management ($r=0.013$, $n=123$, $p< 0.05$). Thus, lack of watershed management knowledge was the major challenge to effective community participation in watershed management in Funyula Constituency.

4.6.3 Opportunities for Enhanced Watershed Management

a) Community Knowledge on the dos and don'ts in a Watershed Systems

Findings indicated that 83.7% of the households in Funyula Constituency were aware that it is prohibitive to cut down trees and burn charcoal but they still practised charcoal burning. Eighty eight point six percent (88.6%) were not aware that bush burning was not good/ an illegal practise in watershed areas. Only 15.4% of the respondents knew that cultivating on the slopes was wrong. Through informal interviews, respondents identified lack of alternative source of livelihoods (income) as the driving force to charcoal burning. In some households, primary school pupils practised charcoal burning in order to raise income for the family (Plate 9(a) and 9(b)).

Plate 9(a): *Charcoal burning a common practise in Funyula Constituency*

Plate 9(b): *Cutting down of trees without replanting for charcoal burning*

Comment: *School children participate in charcoal burning and cutting down of trees*

Generally, there was awareness among the people in Funyula Constituency about the dos and don'ts in the watersheds as indicated in Table 4.9.

Table 4.9: Community Knowledge on the dos and don'ts in Watershed Systems

	Logging/ Charcoal burning	Bush burning	Quarrying	Cultivating on the slopes	Killing wildlife	Planting eucalyptus
Know	83.7%	11.4%	4.1%	15.4%	3.3%	10.6%
Don't know	16.3%	88.6%	95.9%	84.6%	96.7%	89.4%

Source: Author, 2010

b) Community watershed management best practises

Respondents' findings showed that communities were practising watershed management activities on their farms. For instance, 80.0% of all the respondents distributed in the sampled villages were practising soil or stone bunds, 60.0% terraces, while 80.0% reported to have been practising drainage ditches. From direct observation the study established that boundary marking was done in the traditional way by digging small furrows to separate the gardens. Consequently, 58.0% of the interviewed households have

live fences around their homesteads while 79.3% had planted trees in their farms and homesteads as shown in Figure 4.3.

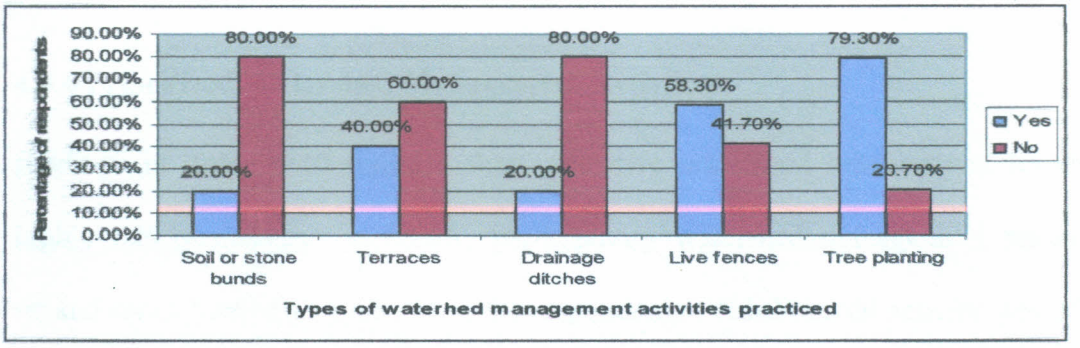


Figure 4.3: Types of Watershed Management Activities Practiced

Source: Author, 2010

Contrary to the view that there is limited access to credits/inputs as indicated earlier in this study, the community practised the above activities for various reasons. This may be as a result of the increased demand for watershed resources as well as demand to increase productivity of the resources to cater for the growing human and livestock population. However, the community may be practising live fences and tree planting for other reasons other than watershed management. Aloo (1993) concluded that people in Funyula Constituency were planting trees to satisfy two basic needs, the need for shelter and food. In addition, they also planted trees for cash, since they sold some of the fruits. Communities also recognized the need for fuel wood although it was not their priority for planting trees. It was found out that the fence, not only formed a barrier against real dangers to the homestead, but also contained "magical" plants that protected the homestead and the inhabitants against sorcery and other supernatural powers.

Further, the study indicated that high value exotic tree species were planted in plenty. 51.3% had planted *Grevillea robusta*, 29.4% *Eucalyptus saligna* and 17.6% cypress none of the respondents had planted local species. More so, because of their low economic values, 34.5% had planted fruit species.

4.6.4 Prioritized Watershed Management Activities

Findings in Table 4.10 indicate that, collective watershed management training was highly ranked activity at 80.5%, participatory watershed management research was ranked second activity by 63.4% of the respondents. Third ranked activity was collective collaterals and credit by 30.1%, the least ranked watershed management activity that could involve the setting up of a resource centre to facilitate watershed education and knowledge transfer to communities.

Table 4.10: Prioritized Watershed Management Activities n=123

Activities to utilize CDF	No. of respondents	Percentage
Participatory watershed management research	78	63.4
Collective watershed management training	99	80.5
Collective collateral/ credits/ Funding	39	31.7
Watershed Monitoring and reporting	37	30.1
Providing equipment/materials/inputs	11	8.9
Watershed management information	26	21.1
Resource centre	4	3.3

Source: Author, 2010

*(**Note:** some respondents identified more than one activity)*

Findings showed that Funyula Constituency CDF has never funded any project in watershed research, training, monitoring, and resource centre nor provided inputs preferred in the community. Projects in participatory watershed research, trainings, monitoring and reporting and provision of watershed management information are

essential to sustainable social and economic development of the community. It is evident that community prefers CDF to provide watershed management trainings compared to any other activities listed in Table 4.10. In correlation analysis, the findings show that lack of knowledge and information is a major limitation to sustainable watershed management practices in Funyula Constituency.

4.6.5 Community Perceptions towards CDF and Watershed Management

This study used seven items to measure perception of the respondents towards CDF projects and watershed management approaches. These centred on whether the respondents perceived present and future watershed management needs in Funyula Constituency, whether they understand their role in CDF, community development and watershed management as the key stakeholders in CDF projects.

Findings in Table 4.11 indicated that 32.5% of the respondents strongly agreed, while 39.8% agreed that CDF projects had impacts on watershed resources. Eight point one percent (8.1%) strongly agreed that the impacts were positive while 9.8% of the respondents were in agreement with the same statement, contrary to 45.5% of the respondents whom strongly disagreed with this sentiment.

Table 4.11: Respondents Perception towards CDF and Watershed Management

Statement	Strongly Agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly Disagree(%)
CDF projects impacts on watershed resources	32.5	39.8	5.7	11.4	10.6
CDF projects have impacted positively on watershed systems	8.1	9.8	7.3	29.3	45.5
CDF can be used to promote community participation in watershed management	24.4	56.1	8.1	4.1	7.3
Communities depend largely on watershed resources for their livelihoods	37.4	51.2	8.1	2.4	0.8
Watershed management should be mainstreamed in all CDF projects	17.9	52.0	13.0	7.3	9.8
Community participation in watershed management will reduce destruction of watershed resources.	29.3	64.2	3.3	0.0	3.3
CDF Act should be revised to increase allocations to watershed management activities.	33.3	59.3	3.3	0.8	3.3

Source: Author, 2010

Findings from the transect walk identified some of the negative CDF projects impacts on the watersheds as stamps of mango trees along the roads indicating that the mango trees were cut in order to expand the road. Roads and bridges constructed using CDF did not have systems to manage the run off as observed in Mumbao and Ludacho bridges among others. From one of the interviews it was revealed that there is conflict zone between CDF projects and the community on the management of the watershed resources;

> *"We were happy when CDF projects were introduced. We knew our needs will be taken care of. However, it is sad to see what CDF is doing to our environment. All mango trees along the roads were cut down to expand the road which only one vehicle uses. We had lived with the road and our mangoes for many years without problems. In addition, roads directed the runoff into my 'shamba', all my crops along the trench were washed away and the soils in that area are now barren I cannot plant any crop. I decided to block the trench; neither CDF nor the road provides food for my family".*
>
> Source: A woman, Lugala sub location, 2010

This may be one of the reasons why the community perceived that CDF projects had negative effects on the watershed resources.

Further, findings indicated that, 56.0% agreed that CDF projects can be utilized in enhancing community participation in watershed management activities. This was important because, 50.0% of the respondents felt that their livelihoods largely depended on the wellbeing of watershed ecosystems. Therefore, 50.0% of the respondents felt that it is important to mainstream watershed management activities in CDF projects to reduce the destruction of the watersheds. To effectively integrate watershed management into CDF projects, more than 60.0% of the respondents felt that the CDF Act should be revised to increase the amount allocated in environmental services to accommodate watershed management activities.

CHAPTER FIVE : SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The findings of the study on the assessment of adoption of watershed management for sustainable CDF projects in Funyula Constituency revealed that:

At least 91.1% of people in Funyula Constituency received their monthly income from all farm activities. The farming activities were characterised by low input level and mainly for subsistence purposes while poverty levels were reported to be at 65.99% in the constituency.

There has been progressive increasing trend in the amount of CDF allocated to Funyula Constituency since its inception in the financial year 2003/2004. This is due to high poverty levels which is important factor to determining the CDF allocated.

Constituency Development Fund has been utilized in the provision of social services with the biggest portion allocated to construction type projects in education, health, water, roads and bridges, energy, sports and law and security sectors.

Education sector was allocated the largest portion of CDF in the financial years reviewed over half (57.08%), and (80.11%) in financial years 2006/07 and 2007/08 respectively, with the biggest number of 55 projects, while environment sector had no project on the ground although it was allocated a minimal allocation of CDF.

Socio-economic factors such as poor educational facilities, poor road network and need to access to safe and clean drinking water are some of the local factors that influenced the allocation of CDF to various community development projects utilizing all CDF available

leaving no allocation to watershed management activities. However, watershed goods and services contributed to livelihoods of Funyula Constituency directly by providing; fuel wood to 92.7%, farmland to 97.6%, building timber, posts and rafters to 87.8%, medicinal herbs to 87%, grazing field and fodder to 87.8%; soil conservation to 87%, provision of water to 94.3% and biodiversity maintenance to 87.8% to households among other services identified by the respondents.

CDF projects activities affected the biophysical environment activities; in the highlands, quarrying, felling of trees, grading of weathered roads were the main activities that affected the watershed; in the middle land, clearing for vegetation for electricity line, brick making sites, rehabilitated dams, fish ponds, protected springs and drilled boreholes, and rain harvesting were the main CDF activities that affected the watershed. In the lowland, sand harvesting was the only major activity identified which has intensified as a result of CDF projects. In most cases EIA studies were not done to mitigate the negative impacts of CDF projects.

About 40.7% of the respondents were members of watershed user groups. Whereby 95.1% agreed that membership to watershed user groups enhanced their skills in watershed management. The study established that tree nursery management, tree planting techniques, forest fire management, watershed activities monitoring and reporting, and soil management techniques were activities that the groups offered to their members. 86.2% believe that the government should lead other institutions in watershed management activities. While 38.2% felt that CBOs and NGOs should be targeted by CDF in enhancing watershed management activities in the area. While, 55.3% felt that all

members in the community regardless of gender, age and position held in the community should be targeted by CDF when considering watershed management activities in the community.

The respondents identified several limiting factors for their participation in watershed management activities, that include; environmental limitations; weather related shocks and limited watershed management capacity. Socio-economic limitations include; limited access to credit facilities/inputs, watershed related conflicts, limited participation in CDF projects and interference from the neighbourhood. However, there were opportunities for enhanced CDF projects in watershed management activities, these include; the existing community knowledge on the dos and don'ts in the watershed, community best watershed management practises such as soil and stone bunds, terraces, live fences, ditches and tree planting activities. The respondents prioritized participatory watershed research, collective training and information, watershed management monitoring and reporting, provision of inputs and a resource centre as watershed management activities to be prioritized by CDF.

Ultimately, the study has also demonstrated how important watershed management activities are for sustainable livelihoods and poverty eradication in Funyula Constituency. The health watershed ecosystem will ensure improved agricultural productivity. Constituency Development Fund can be utilized to ensure sustainable watershed management practises in the area.

5.2 Conclusions

It is evident from the study findings that socio-economic wellbeing of the communities in Funyula Constituency depends largely on agricultural productivity which relies on the watershed health. From the CDF allocation formula, the study concludes that high poverty levels in Funyula Constituency have been contributing to the raise in government allocation to CDF in Funyula Constituency. Studies done elsewhere indicate that investing in watershed management is key to eradicating poverty in agricultural based society (UNEP, 2007). Funyula Constituency CDF projects do not consider watershed management activities compromising the sustainability of the projects and livelihoods. Even though, the financial, social and environmental capitals in a watershed system are mutually supportive to ensure sustainability.

i. The study identified the main factors that influence the allocation of CDF to the various community development projects to be socio-economic factors such as poor education facilities and infrastructure, poor road network and need to access to safe and clean drinking water. Increased investment in education sector contributes to improved social development. However, local watershed management factors were not considered in determining CDF projects. This implies that CDF projects only utilized biophysical environment to provide utility to the people without considering watershed management activities.

ii. The intensified utilization of biophysical resources as a result of increased CDF projects activities in Funyula Constituency has adversely affected the quality of the

watershed. Constituency Development Fund has not so far been used to rehabilitate any of the negatively affected biophysical environmental resources.

iii. Ultimately, the study findings demonstrated that social institutions and organizations can be used in enhancing watershed management activities using CDF. However, from the discussions, there are several limiting factors that have hindered community participation in watershed management activities which form the entry point for future CDF interventions in watershed management activities in Funyula Constituency.

iv. Community perceives that limited watershed management knowledge to be a major challenge in watershed management and majority of people in Funyula Constituency feel that the government should take the lead role in watershed management activities.

Finally, in order to fight poverty, improve livelihoods in Funyula Constituency, mitigate the adverse effects of climate change and increased competition for watershed resources by human populations, the abundance and well-being of watershed resources plays an important and critical role. Therefore, to ensure sustainability of CDF projects in Funyula Constituency and other constituencies in Kenya, there is an urgent need to consider watershed management activities in sustainable socio-economic development programmes. Financial, environmental and social capitals are supportive in local community development projects funded by CDF to ensure sustainability.

5.3 Recommendations

Based on the study findings the following interventions are recommended to ensure future sustainable CDF projects by considering watershed management activities in Funyula Constituency:

a) The government and people of Funyula Constituency should ensure equity in sector CDF allocation to various community development projects. Watershed management CDF projects at the local level should be integrated with all stakeholders' interests and strategies. This calls for restructuring the CDF committees to allow joint planning, budgeting, supervision, monitoring and evaluation of the development projects by experts from other sectors including roads, water, and agriculture and research institutions.

b) Institutional and legal framework where amendments in CDF Act of 2007 are required to integrate watershed management approaches with those of CDF and within broader community development planning framework which should increase community participation, transparency and accountability in CDF performance and other government sector performance on prioritization of projects and decisions that have impacts on watersheds systems.

c) Utilize CDF to provide incentives and alternative source of livelihoods to regulate the use of watershed ecosystem goods and services. CDF should introduce high value crops and businesses to reduce over dependency on watershed systems resources.

d) With the growing demand of watershed goods and services that exert pressure on watershed ecosystems leading to degradation, encouragement to enhance the best practises and the development of technologies designed to increase the efficiency of resource use or reduce the impacts of degradation of ecosystems is needed in CDF projects. Indigenous watershed management knowledge should factor in cultural and traditional practices to ensure that both men and women have practical equal rights in the watershed management project cycle.

e) Increase community participation in CDF project identification, monitoring and reporting forums where people at the grassroots level should be enlightened on the roles and objectives of CDF Act and CDF projects in watershed management. There is need to mainstream watershed management activities in poverty eradication efforts since fighting or reducing poverty does not only mean coming up with infrastructure but also protecting the biophysical environment upon which the people generates their livelihoods.

f) Continuous capacity building for community based institutions, groups and other members through public education, empowerment of communities especially the CDFCs and PMC members on planning and priority setting, budgeting, administration and effective supervision, monitoring and evaluation: should be set up at the community levels to equip the community institutions and groups with watershed management knowledge and information necessary to ensure sustainability of CDF projects through continuous participatory research and collective training communities in sourcing for funds from other donors to supplement government budgets for watershed management activities.

Finally, the study identifies the need for further investigation into the dynamics of decentralized development agendas in order to accommodate the changing environmental needs and reforms in Kenya. Most importantly to what extent these funds succeed or fail in ensuring sustainability of the livelihoods of the poor during these dynamic processes.

5.3.1 Recommendations for further research

Future research that could add more value in such an environmental management problem could focus on, among others, the following themes;

- The long term effects of decentralization development planning on environmental management in Kenya.
- Modalities of community involvement in watershed management as well as measures to increase benefits communities enjoy from watershed resources in a sustainable manner.
- Implications of climate change on poverty in relation to the declining watershed services and goods.

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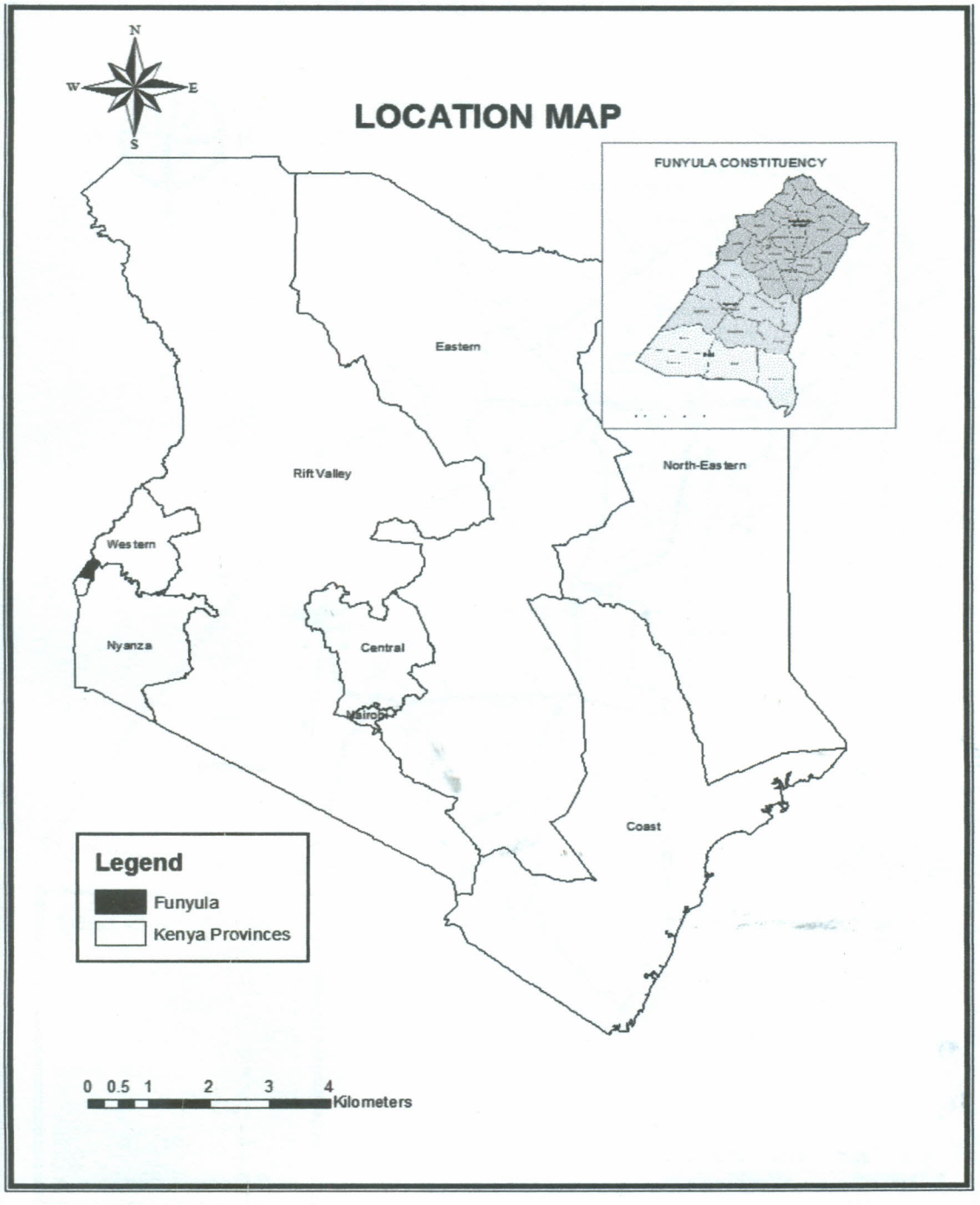
APPENDICES

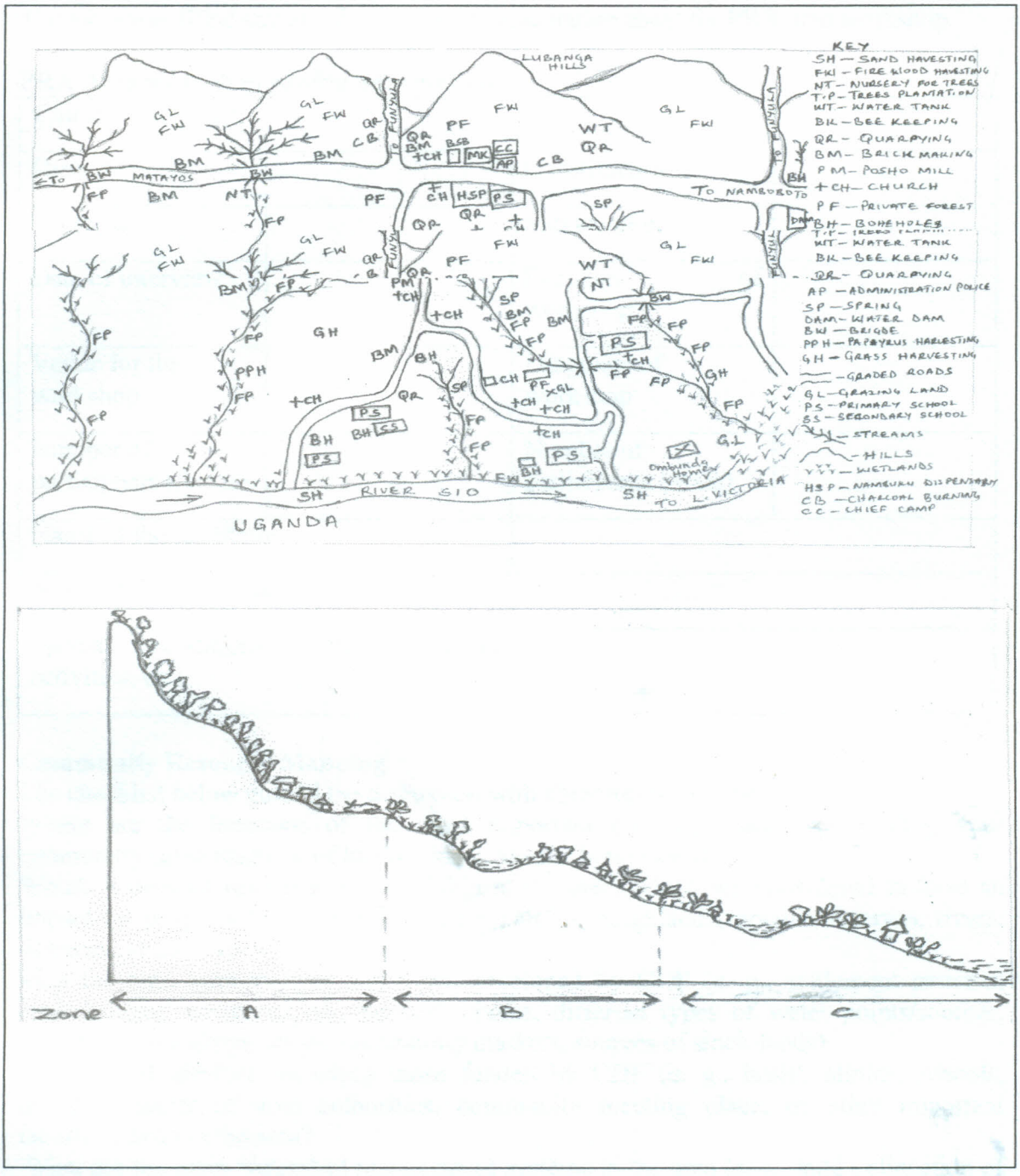
Appendix I: Map of Funyula Constituency



Source: Author, 2012

Source: Author, 2012

Appendix II: Community participatory map and transect walk route



Appendix III: Participatory Community mapping checklist

The table was filled and attached to the documentation sheet for PRA area workshop.

PRA Area workshop profile information

Country: KENYA			
District		Constituency	
Location		Sub location	
Date of interview		Duration of workshop	
Venue for the workshop		Language of workshop	
Number of participants (female		Number of participants (Male)	
Name of the facilitator			
Name of the Note Take			
Special conditions (weather, local activities, etc)			

Community Resource Mapping

The checklist below guided the discussion with community members.

Where are the locations of the most important area landmarks surrounding your community (give example of landmarks – external boundaries)?

Which watershed resources are available in the area, which are considered to have an impact on people's livelihoods (e. g., crop fields, rangelands, grazing reserves, rivers, degraded areas, forests, and hills)?

Map the area infrastructure and those developed by CDF (e. g., settlement patterns, roads/bridges, power supply, network access, different types of water points/sources, community buildings, shops, commodity markets, sources of stock feeds)

What social services including those funded by CDF (e. g., health clinics, schools, dwelling places of area authorities, community meeting place, or other important facilities) exist in the area?

What are the main watershed management systems in the area (e. g., land , allocation of cropping, communal rangelands, grazing reserves (browse and fodder plant species), seasonal herd movement, and mechanisms for resource allocation to different uses)?

Interviewing the diagram (Questions asked or observations made during the Mapping process)

1. Which watershed resources are plentiful? Which are scarce or lacking?
2. How do community members make resolve conflicts and make decisions with regards to problems associated with access to and use of watershed resources?
3. Where are observable unsustainable land practices?
4. What is the watershed management activities practiced? And why are they practiced?
5. What are the general effects of CDF on land, water and forest resources in this area?
6. At the community and household level, who makes decisions on the use of watershed resources? Water? Forest products? Land use?
7. What are some of the challenges of community participation in watershed management in the area (e.g. seasonal migration to grazing areas, disease, climate, and seasonal migration for labor, lack of finances, lack of skills, and other challenges)?
8. How can CDF be utilized in watershed management in the area? Who should be targeted?
9. What are the institutions used in watershed management?

Template for analysis – Mapping

Mapping issues	**Detailed information**
Natural resources	
Water catchments	
Crop fields	
Rangelands	
Gardens	
Forests	
Others (specify)	
Infrastructure	
Roads/bridges	
Settlements	
Commodity markets	
Stock feed sources	
Others (specify)	
Social services	
Health	
Schools	
Church	
Local administration	
Traditional authorities	
Extension offices	
NGO/CBO offices	
Others (specify)	
Watershed resource use system	
Croplands and use of crop residues	
Communal rangelands	
Grazing reserves	
Water use	
Agro forestry practices	
Brick making	
Charcoal burning	
Quarrying	
Sand harvesting	
Others (specify)	

Appendix IV: Key Informant Checklist

This checklist targeted government extension agents, NGOs and CBOs representatives, and opinion leaders in the community.

Key Informant profile information

Country: KENYA			
District		Constituency	
Location		Sub location	
Date of interview		Duration of interview	
Key informant interviewed: (Government official, NGO or CBO representative, Member of farmers organization, Opinion leader etc.	Name of the Organization		
	Title of the Informant		
Name of the Interviewer			
Name of the Note Take			

Key informant interview guide

During the research Key informants were asked the following questions;

1) Do CDF encourage community participation in watershed management?
2) Do you involve local community when making decisions on CDF project that affect watersheds?
3) Name some of the areas where CDF projects have affected biophysical environment?
4) How can community use CDF in watershed management?
5) Are you aware of the contents in EMCA 1999? Is the public aware of the Act?
6) Do you think that CDF projects help reduce watershed related conflicts in this community?
7) Are aware of the content in the CDF Act 2007? Is the community aware of the Act?
8) What are the likely impacts of utilizing CDF in watershed management?
9) Which institutions in this community can use CDF in watershed management?
10) Do CDF projects committees carry out environmental impact assessment study on the proposed projects? Show the reports.
11) Name some of professional experts you know make up CDF projects committees?
12) What are the factors that determined how CDF is allocated to development projects?
13) What are the watershed resource management practices in this area?
14) What are the challenges in community participation in watershed management?
15) What are the likely opportunities for using CDF community participation in watershed management?
16) How much has CDF allocated on watershed management activities in this area since 2003 to 2009
17) What are some of the reasons for integration of watershed management approaches in CDF projects?

Appendix V: Household Questionnaire

Only the household head or spouse was interviewed. Randomly replaced the Household if none was present.

Are you interviewing the household head or spouse [___] = YES [___] = NO (Tick)

Respondent's name_____

Respondent's position in the household [_____] (code) **1** = Head **2** = Spouse

Type of watershed adjacent to (*Forest, Water, Land resources*) _____

_____

SECTION: A Household main socio- economic attributes

1. A. Provide the following details about the **household head**

SEX [CODE: 1 = MALE, 2 = FEMALE]_____[___]

Main occupation /activity _____[___]

Years of performing the activity (years)_____[___]

Religion _____[___]

Activity codes	7= Retired with pension	**Religion (code)**
0 = None	**8** = Retired without pension	**1**= Catholic
1 = Farm management/farmer	**9** = Religious leader	**2** = Muslim
2 = Civil servant	**10 =** In school/college	**3** = Hindu
3 = Employee in private enterprise	**11** = Pre-school age	**4** = Seventh Day Adventist
4 = Businessman	**12**=Other(specify)___	5=Protestant (all except SDA
5= Laborer on farm		6=Traditional African Religion
6=Laborer off farm		7= Other(specify)_____

1. B In which of the **following categories** do you estimate your **total monthly household income**, (1) from all farm activities [___], (2) working members [___], (3) business income [___], (4) pensions and remittances from elsewhere [___] (tick).

Ksh per month	Tick	**Ksh per month**	Tick	**Ksh per month**	Tick
<1,500		5,000 - 10,000		> 30,000	
1,500 - 2,500		10,000 - 20,000			
2,500 - 5,000		20,000 - 30,000			

SECTION B: Establishing socio-economic and environmental factors of using CDF for community participation in watershed management

B.5 Has the household taken any **watershed management** measures **during the last two years**? [___] = Yes [___] = No

B.5.1 If **yes**, please indicate the type conservation you have undertaken:

Type conservation [Code]	Unit (acres or m2)	Estimated area/length under the structure

Type conservation	**4.** = Fences
1= Soil or stone bunds	**5**= Trees
2= Terraces	**6**= Others: specify:_____
3= Drainage ditches	

B.5.2 If planted trees which species did you plant?

_____

B.5.3 how has CDF helped you the conservation activities above?

_____

B.6 Does the household experience shocks (*either weather related or any other)?*

Yes [__] No [__]

B.6.1 If yes, which shocks do you experience? 1=Drought 2= Floods 3=Pest infestation
4=other (specify)

B.7 How do you deal with the shocks above?

_____

B.8 How do watershed resources help you deal with the shocks above?

_____

B.9 How can CDF help you deal with the shocks above?

_____

B.10 Please ask about the CDF Act and EMCA legislations	
Have you ever heard of the CDF Act?	1=Yes 2=No
What do you understand in the CDF Act?	
Have you ever participated at any level in CDF project?	1=Yes 2=No
If yes , what was your role?	
Where did you get information about the CDF project?	
What are some of the effects of CDF projects on the biophysical environment?	
Have you ever heard or read about EMCA 1999?	1=Yes 2=No
If yes, what are the requirements of EMCA 1999?	
Do you think watershed management approaches are integrated in the CDF projects?	

B.11 How can CDF promote your participation watersheds management? (List them)

_____

_____

_____

B.12 This section looks at benefits, costs and impact of watershed destruction		
What are the **main benefits** that you get from watershed systems?	1= Firewood 2=Charcoal 3=Farmland 4=Timber/posts 5=Medicinal herbs and aromatic plants 6=Fodder 7=Grazing 8=Poles 9=Soil conservation	11=Water 12=Maintenance of biodiversity 13=Hunting and gathering 14=Seedlings 15=Quarrying 16=Recreation 17=Rafters 18=Other(Specify)
What challenges do you incur during implementation of practices?	1=lack of credit and inputs 2=lack of proper knowledge on management 3=land constraint 4=high start-up cost 5=interference	From neighbours 6=political interference 7=other (specify) (list in order of Importance)
Are there costs related to conserving the watersheds?	1=yes 2=No	
If yes, what are the costs associated with conservation of the watershed resources?	1=More labour time 2=High maintenance Costs	3=High establishment costs for initiatives 4=other (specify)

In your opinion, what has been the general trend in watershed resources in this area in the last 10 years?	1=declined 2=increased	3=not changed 4=don't know
If declined, how has it impacted on your livelihood?	1=no impact 2=lack of fuel wood 3=lack of fodder	4=lack of medicinal herbs 5=lack of timber 6=other(specify)
What are the coping strategies taken by the households for impact?	1= stop using fuel wood 2= use less fuel wood 3= use paraffin 4= use energy saving stoves/jikos 5= buy fuel wood 6= more time to collection	7= more labour 8= planting trees 9=buy herbal medicine 10= other (specify

B.13 Apart from the benefits identified above, how else would you like to benefit from the watersheds? _____

B.14 Do you experience problems with the watershed management authorities? Yes [___] No [___]

B.14.1 If yes above, please list the cause of the problems

_____

B.14.2 Watershed related conflicts	
Do you experience **other sources** of conflicts apart from the ones mentioned above?	1=Yes 2=No
Which are these conflicts?	1=Human-wildlife 2=Competition for grazing land 3=Competition for settlement space 4=Competition for agricultural land 5=Other (specify) (list according to importance)
How do you solve each of these problems? (list)	_____ _____ _____ _____ _____

B.15 What activities are presently not allowed in the watersheds?

_____

B.16 What is your opinion on the number of people using the watershed resources in the last five years?

Increased [__] Stayed the same [__] Decreased [__] Don't know [___]

B.17 How can CDF help to reduce watershed related conflicts?

_____
_____
_____
_____
_____

SECTION C: Identifying community institutions and structures used in watershed management

C.1 Which institutions in this community should CDF used for watershed management?

Family [__] Religious group [__] School [__] CBO/NGOs [__] Youth groups [__] Women groups [__] other (specify) [_____]

C.2 Who should be targeted in watershed management activities by CDF in the community?

Men [__] Women [__] Children [__] Youths [__] community elders [__] All members [__] other (specify) [_____]

C.3 What watershed management activities should CDF offer to the group?

Participatory Research [__] Training [__] Collective saving plans [__] Collective collateral/credit [__] Equipment/ materials [__] Watershed management information [__] Resource center [__]

Other (specify) [_____]

C.4 This section addresses the issue of membership to community based organizations (CBOs)	
Do you agree that membership to group promote watershed management in this area?	1=Yes [___] 2=No [___]
Does any member of this household belong to a group involved in watershed management related activities?	1=Yes 2=No
If yes, name the group(s) you belong to	
What watershed management activities are you taught in this groups.	1= Tree nursery management 2= Tree planting 3=Forest fire management 4= Monitoring/ Reporting **5**= Soil or stone bunds **6**= Terraces

	7= Drainage ditches 8. = Fences 9=Other(Specify)
In your opinion, are the CBOs making useful contribution to watershed management and conservation?	1=Strongly agree 2=agree 3=neutral 4=disagree 5=strongly disagree
If the response in column 1 is no What are the reasons for not getting involved?	1=not aware 2=aware but not interested 3=Other (specify)
Do you support the watershed management activities in the groups?	1=yes 2=no
If no, what are the reasons for not supporting the activities?	1=no benefits 2=few benefits 3=no reason
What sources of watershed management information does this household have access to?	1= Radio 2=Newspaper 3=Bill boards 4=Television 5=Public baraza 6=Forestry Department 7=Other (Specify)

C.5 This section assesses the level of skills on use of recommended watershed management practices	
Have you received training on sustainable watershed Management practices?	1= Yes 2=No
If Yes, from where?	1=Extension agent 2=farmer Training centre 3=farmer field days 4=Media 5=cooperative society 6=Other (specify)
For how long have you received the training?	
How often do you receive this training?	1=Weekly 2=Monthly 3=Every 3 months 4=Half yearly 5=Yearly
Have you applied the knowledge from training on your farm?	1=Yes 2=No
How would you rate the training gained for helping you in Sustainable watershed management practices?	1=Very important 2=Important 3=Less important 4=Not important
What is your level of satisfaction with the knowledge gained from these trainings?	1=Very satisfied 2=Satisfied

	3=Less satisfied 4=Not satisfied
Will a possible increase in extension provision improve farmers Awareness and implementation of watershed management?	1=Yes [ ] 2=No [ ]

C.6 Are you a member of a watershed user group? Yes [__] No [__] (if no, skip to 5.8) If yes, how long have you been a member? [_____]

C.7 How many members are there in total in your group? [_____]

C.8 Why did you become a member? To gain access to water [___] To gain access to credit [___] To get training on watershed management practices Contribute to collective actions by the community [___] other (specify) [___]

C.9 what services does the group offer? Training [__] Collective saving plans [__] Collective collateral/credit [__] Collective purchase [__] Water provision [__] Other (specify) [_____]

C.10 What is your level of satisfaction with the services being provided? Very satisfied [__] Satisfied [___] less satisfied [___] not satisfied [___]

C.11.1 If not satisfied, what are the reasons? Inefficient service provision [__] Members not active [__] Mismanagement by officials [__] High group fees [__] No consultative approach [__] other (specify) [_____]

C.11.2 If no to 5.1, what are the reasons? Never heard of one [__] Membership too costly [__] Not interested [__] Not sure of the benefits [__] No change from those who are members [___] other (specify) [_____]

C.13 What activities would you like CDF introduce in this area to assist you in watershed resource conservation?

_____

C.14 Who should offer a lead role in implementing the activities stated above? Government [__] NGOs [___] CBOs [__] Church groups [__] other (specify) [_____]

SECTION D: Probing perceptions and attitude towards CDF and watershed management

D.1 To what extent do you agree with the following statements about CDF and watershed management? **5. Strongly Agree, 4. Agree, 3. Undecided, 2. Disagree, 1. Strongly Disagree**

Statement		**Level of importance**				
		1	**2**	**3**	**4**	**5**
a	CDF activities impacts on watershed resources					
b	CDF activities have impacted positively on watershed systems					
c	CDF can be used to promote community participation in watershed management					
d	Communities depend largely on watershed resources for their livelihoods					
e	Watershed management should be mainstreamed in all CDF					
f	Community participation in watershed management will reduce destruction of watershed resources.					
g	CDF Act should be revised to increase allocation on watershed activities.					

Appendix VI: Letter of Research Authorization

KENYATTA UNIVERSITY
School of Environmental Studies
Department of Environmental Studies and Community Development
P.O. Box 43844-00100, GPO Nairobi
Tel: +254-020-810901-19, ext 220; Email: chairman-ecd@ku.ac.ke

Date: 5th May 2010

TO WHOM IT MAY CONCERN:

Dear Sir/Madam,

RE: REQUEST FOR RESEARCH FACILITATION

This is to confirm that **Mr. Namenya Daniel Naburi** of Registration Number **N50/10001/2008** is a postgraduate student in this department currently in his research and final year.

As part of the requirements for successful completion of the course, the student is currently working on a research project entitled:

The Relationship between Constituency Development Fund and Community Participation in Watershed Management in Funyula, Kenya.

I kindly request you to accord him any assistance possible in terms of access to relevant premises, acquisition of data, information, literature and privilege of expert consultations; on production of a valid university student identification card.

The department and university value and appreciate your support in this aspect of higher education.

Thank you.

KENYATTA UNIVERSITY DEPARTMENT OF ENVIRONMENTAL STUDIES & COMMUNITY DEVELOPMENT 05 MAY 2010 P.O. BOX 43844, NAIROBI

Dr. Fuchaka Waswa
Chairman, Department of Environmental Studies and Community Development

FW/gww

Confirmed
T.K. Sele
for DC Samia
DISTRICT COMMISSIONER SAMIA DISTRICT
14/5/2010.

Operation is genuine
Daniel Idalal
5/10/2010