

University of Applied Sciences



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**INTERACTION OF COPING STRATEGIES AS DETERMINED BY RAINFALL:
THE CASE OF TURKANA RIVERINE SMALLHOLDERS, KENYA**



Thesis for the Degree of Master in Management of Development
Specialisation in Rural Development and Food Security

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September 2011

WAGENINGEN, The NETHERLANDS

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DECLARATION

I, **Protus Ewesit AKUJAH**, Registration Number **7 4 0 4 0 8 0 0 1**, hereby declare to the examination board of Van Hall Larenstein University of Applied Sciences that this thesis is my original work and has not been presented to any other university for an award of academic degree. All other sources of materials used for this thesis that are not my own work have been dully acknowledged.

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SEPTEMBER 2011

DEDICATION

I would like to dedicate this piece of work to my beloved family; my wife, Christine Ikai ARUMU and my only son Brian Mana Ewesit AKUJAH, last but not the least my Brother Thomas Ekamais AKUJA.

ACKNOWLEDGEMENTS

First and foremost, it is my pleasure to recognise and acknowledge the financial support from Netherlands University Foundation for International Cooperation (NUFFIC) otherwise this study would not have been possible. I wish to register my sincere thanks to the people of Kalemunyang and Napeikar for their useful contribution in this research and more important their cooperation during the field work despite the economic and climatic hardships they were facing at the time of the research, their valuable knowledge and time they sacrificed is highly appreciated.

I would like to recognise my family for their patience and endless moral support during my study in VHL and my stay in the Netherlands.

I am very grateful to my supervisor Dr. Robert Baars for his constant and tireless effort of guidance and encouragement throughout the research period. He was there to listen and offer advice all the time.

I would also like to appreciate the support from the following institutions; Arid Lands Resource Management Project through its representative Maurice Lokwaliwa, Ngitira Akure for World Vision Kenya and Peter Lochuch representing Child Fund for their valuable time and information they provided.

I would like to appreciate the work of members of VHL staff who assisted in one way or the other during the course of this thesis. Last and not the least, my regards to all my colleagues whose concern and co-operation was necessary and I would not have been successful without them. Above all, I wish to glorify the name of the almighty God for the amazing strength he granted me during the course of this study.

ALAKARA NOI!

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ACRONYMS / ABBREVIATIONS

ALRMP:	Arid Lands Resource Management Project
ASAL:	Arid and Semi-Arid Lands
CF:	Child Fund
FFA:	Food for Asset
FGD:	Focus Group Discussion
GoK:	Government of Kenya
HHH:	Head Household
IGAs:	Income Generating Activities
KII:	Key Informants Interview
NGO(s):	Non-governmental organisation(s)
PRA:	Participatory Rural Appraisal
TANet:	Turkana Advocacy Network
TRP	Turkana Rehabilitation Project
UNCCD:	United Nation Convention to Combat Desertification
UNDP:	United Nation Development Programme
UNEP:	United Nation Environmental Programme
VSF-B	Veterinarian Sans Frontiers - Belgium
WFP	World Food Programme
WHO:	World Health Organisation
WVK:	World Vision Kenya



ABSTRACT

This study examines the interaction of coping strategies pursued by Turkana riverine smallholders as determined by rainfall related adversity. The research explored the reasons why certain households pursue particular strategies and not others between and within the same socio-economic groups in the same context with the aim to generate information that can be used to design suitable projects that can respond to different specific needs of vulnerable households or complement local coping strategies sustainably.

Using interview data on sources of livelihoods, different socio-economic groups of riverine smallholders categorized their sources of livelihoods into principal and complementary sources. During period of rainfall crisis, principal sources were lacking and all socio-economic households pursued multiple complementary sources to compensate the failed principal sources.

Rainfall in Kalemunyang and Napeikar was categorized as highly erratic and unreliable, both in frequency, distribution and amount. This poses a negative impact on riverine farming and food security among the riverine smallholders presenting a bleak picture for the future riverine smallholders' food security and incomes.

From the analysis on shock experience on coping strategies related to rainfall variability, Kalemunyang and Napeikar respondents' responses were categorically grouped into five types of coping strategies namely alternative income strategies, sale of asset, changes in diet, external support and labour adjustment. From the results, there was no important difference between coping strategies engaged by different socio-economic groups by gender. Alternative income activities engaged in by middle and poor households contributed insufficient returns to the household such that sustaining the household livelihood assets was not possible. Survival for the fittest meant extensive utilization of natural resources (woodland) which poses a negative impact to the environment worsening rainfall variability which could set poor riverine households into a vicious cycle of poverty.

Consumption of wild foods was mentioned in the study as a self-choice for all socio-economic groups though the extent and variety differed greatly between well-off and poor households. Well-off households ate them to supplement their diet. Middle households relied on them more as a means of limiting consumption of their own production to keep sufficient stored for the hardship period. Poorer households relied heavily on them throughout the year as on-farm production and sustainable exchange opportunities left out a considerable shortfall to be made up through the collection of wild foods.

Results from sale of productive assets by all the socio-economic groups were reported as a last resort to avoid continuous eating fewer or skipping meals. Disposing of assets was stated affected mostly the poor future productivity as it takes them many years to reacquire the same assets. Recalling children back from school to work in neighbours home or stay with relatives was reported by poor households, which was thought as missed opportunity as it was considered a sacrifice capacity to build a better life in future.

The study was able to establish that households skip or reduce meals to make food stocks last for a long time. But, it was found that poor households skip meals because of complete exhaustion of food stocks and when food was available children and the elderly members of the household were given priority.

The study on external support showed that social safety net played a great role for the riverine smallholders during rainfall adversity including borrowing of grains and livestock (goats) as this was expected to be reciprocated in future. Other external support includes relief and development programmes by the government, church and the NGOs. Lack of financial resources to reach many beneficiaries was stated as a major setback coupled with low level of community literacy to engage in technical project implementation leading to limited impact and sustainability. For the purpose of quick asset rebuilding and recovery, riverine smallholders preferred long term interventions including underground water irrigation, IGAs for income diversification.

In essence, interventions provided by relief agencies and the government partially addressed the needs of the riverine smallholders. This was evident on how respondents recounted the number of times food insecurity among riverine smallholders had occurred despite the relief aid. The reason given for this claim was that interventions were not people's needs driven but rather institutions interest driven.

The study puts forward the following operational and policy recommendations based on the result of the study; there ought to be holistic community empowerment in decision making process regarding needs identification and prioritisation, implementation and monitoring; institutions should address challenges surrounding targeting, accountability, transparency and good governance in food for asset projects, there is need to introduce IGAs to support riverine smallholders to diversity their livelihoods, there ought to be community participation in disaster response assessment and strengthening local coping strategies by designing different responses for male and female socio-economic groups during risk management planning including promotions of environmental awareness raising programmes.

The findings of this study need to be incorporated in rainfall variability effects and consequences vulnerability assessment to guide the existing disaster preparedness and risk management coordination team in the County for future interventions.

Key words: Coping strategies, riverine smallholders, rainfall variability, Turkana, Kenya.

CHAPTER ONE

1.0 INTRODUCTION

According to Rockström, et al. (2007), there is a close correlation between hunger, poverty and water. Most hungry and poor people live in the regions where water challenges pose a particular constraint to food production. This is why the world's hotspots for hunger and poverty are concentrated in the arid and semi-arid regions of the world. Therefore water is a key challenge for production due to extreme variability of rainfall, long dry seasons, and recurrent drought, floods, and dry spells. It is evident that climate hazards have played havoc with the human activities for development for a long time. Generally, climate variations have a significant impact on the economy and human situation because favourable amounts and timing of the rains have a direct positive imprint on gross domestic product and rainfall deficits have a negative impact (Lundqvist and Falkemark 2010).

The East African region is considered to be drier in several climate analyses, with reduction in the length of the growing season. This is expected to have the potential to make local livelihoods that depend on rainfall more vulnerable (Galvin, et al., 2004). In dry areas, moisture is a most limiting factor for crop production and it contributes to insecure household food security. Adverse weather (with low and highly unpredictable rainfall, low soil fertility and nutrient contents constrain crop production, and there is high risk of very low production levels, or even crop failure (Majule and Gwambene, 2010). Climate change scenarios for Africa present an even bleaker picture for the future, where food security and smallholder incomes are severely threatened as growing seasons shorten. Rainfall variability and uncertainty surrounding its annual reliability have prompted dry land riverine smallholders to cope in order to meet their household needs (Daze, 2007).

Some research has shown that an increase in the frequency of climate related risks could lead households to lower expected income which in turn can cause fall below poverty threshold level (Shewmake, 2008). Responding to rainfall related risks requires a combination of various individual responses at farm level and the assumption is that riverine smallholders have access to alternative practices available in their support, which is not always the case. The ability of people to cope with different rainfall hazards varies from household to household and region to region based on existing support system to increase the resilience of affected individuals (Mengistu, 2011). Generally smallholders affected by rainfall related threats have used a number of strategies to respond and adapt to climate change: diversified resource base (to minimise the risk due to harvest failure, they grow many different crops and varieties, and they also hunt and gather wild food plants); change in crop varieties and species; change in the timing of activities (crop harvests, wild plant gathering and hunting); change of techniques; change of location; changes in resources and/or life style (resorting to wild foods in the case of emergency situations including droughts and floods); exchange (obtaining food and other necessities from external sources through exchange, reciprocity, barter, or markets in times of crises); and resource management (enhancing scarce and climate-sensitive resources management), (Kelbessa, 2007).

When considering coping strategies, the ability to diversify livelihoods is critical to local welfare and may be particularly important in mitigating risk, uncertainty and contingencies (Ellis, 1998). Customary safety nets, in terms of the economic, social and political networks and the processes

that affect them, are particularly important for coping strategies in sub-Saharan Africa (Adams, Cekan, and Sauerborn, 1998). These diverse processes interact with physical exposure to shape local vulnerability at any point in space and time. Coping ability can then be considered to be directly linked to entitlements, or the set of commodity packages that a person can command, and thus consumption in the face of an adverse event (Eriksen, Brown and Kelly, 2005).

Coping strategies during adverse rainfall effect calls for diversified means of survival. According to Pandey (2009) the risk of income shortfall is reduced by growing several early maturing crops or pursuing other non-agricultural activities to have high income. Maintaining flexibility is a coping strategy that allows farmers to switch between activities as the situation demands. This is important because flexibility in decision-making permits smallholders not only to reduce the chances of low income, but also to capture income-increasing opportunities when they do arise.

In Turkana, proper farming is basically challenging on the account that Turkana is situated in the arid and semi-arid lands (ASALs) that experience low rainfall and high temperatures that hinder any significant agricultural development. This confirms the fact that rainfall variability in space and time is a central characteristic of arid and semiarid regions (Romero, Guijarro, and Alonso, 1998) and arid and semiarid climates display complex patterns of spatial and seasonal rainfall variability exacerbated by the unpredictability of rainfall from year to year, within the year, and even during a single rainfall event (Ramos and Martinez-Casanovas, 2006). Riverine smallholders living in these harsh environments have developed various coping mechanism over the years. Stringer, et al. (2009) reported that rainfall variability and uncertainty surrounding its annual reliability have prompted dry land riverine smallholders to adapt to dynamic climatic, environmental, and weather conditions throughout history.

The majority of pastoral households dispossessed of their herds by drought and livestock raids are engaged in subsistence riverine farming including growing of vegetables, sorghum and maize along dry river beds as well as rearing of tiny number of small ruminants (sheep and goats). However, riverine farming manifests a low level of production and productivity. This is because of high temperatures and persistent rainfall variability in addition to prolonged droughts. In Turkana, the impact of rainfall variability, drought and increased insecurity has led to a growing emergence of sedentary population pursuing alternative livelihoods (Watson and Binsbergen, 2008). Studies have in fact shown that pastoralism is gradually changing from nomadism to agro-pastoralism or permanent settlements (Aklilu and Wekesa, 2002).

Increased temperature levels are expected to cause additional loss of moisture from the soil, reduced and more intense rainfall and higher frequency and severity of extreme climatic events, including floods and droughts (UNDP-UNEP-UNCCD, 2009). Under such circumstances, riverine smallholders' efforts to subsist mainly on subsistence riverine farming are challenged and compromised as their resilience is gradually being eroded putting riverine population at risk of short and long-term food insecurity.

This has led to the reasoning that long-term rainfall variability is a critical constraint of crop production in arid and semi-arid areas, where conventional irrigation is not common. Water availability is the most critical factor for sustaining crop productivity in rainfed agriculture. Even if a drought-tolerant trait is introduced, water is not available to crops when there is no water in the soil. Rainfall variability from season to season greatly affects soil water availability to crops, and thus poses crop production risks (Koo, 2010), prompting riverine smallholders in Turkana to

employ other supportive activities to augment riverine cultivation that is proving ineffective in meeting their economic needs as a result of rainfall related threats.

1.1 Research Problem

For years smallholders have been facing severe climate related hazards including extreme droughts, rainfall variations, and temperature fluctuations. This is the reason why many families in Africa continue to face problems in obtaining stable and adequate access to food. This food insecurity remains one of the most visible manifestations of their poverty and it has attracted considerable debate at both a theoretical and a policy level. Such food insecurity varies from the recurrent and predictable food deficits faced by some in the “hungry season” just prior to the harvest, to more severe entitlement failures which arise from a mix of socio-economic, environmental and political factors and which at their worst may lead to famine (Corbett, 1988). This reinforces the fact that dry lands are characterised by resource limitations for rainfed agriculture, which limits crops to: millet, sorghum and maize grown in low fertile soils of Turkana.

Riverine smallholders’ responses to climate related hazards and coping strategies are diverse based on their socio-economic status. As rainfall variability continues to bite, riverine smallholders are increasingly pursuing different coping strategies to meet their food consumption needs to withstand the effect of the shock. They do so by combining a number of coping strategies and intensify some of the usual structural livelihoods activities carried out during the normal years. This study aims to map out riverine smallholders coping strategies employed during rainfall related shocks. The research also explores insight into reasons why households do or do not pursue particular strategies and why some households within the same wealth ranking are more vulnerable than others in the same context.

In Turkana, there has been local humanitarian support by government and non-governmental organisations (NGOs) including provision of relief food, distribution of seeds and restocking of small ruminants to affected riverine farming households to help them cope and recover from rainfall unpredictability shock. However, Turkana Advocacy Network (TANet) has observed that the priority and the impact of services these institutions offer to the victims of rainfall uncertainties remain a challenge.

It is for the above observation that Turkana Advocacy Network (TANet), a non-governmental organisation working in the area of food security and livelihoods among victims of natural disasters in providing short and long term livelihood support, intends to collect primary information from the riverine smallholders in Turkana focusing on coping strategies in relation to rainfall unreliability. This information can be used to design suitable projects that can respond to different specific needs and priorities of different vulnerable categories of the people in the community on the basis of their resources capacities.

Effort to pursue the diversity of the coping strategies by subsistence riverine smallholders’ to rainfall variability needs a sound contribution of knowledge and understanding of the interaction of different coping strategies engaged in by riverine smallholders’. This is because riverine smallholders are among the most hit by rainfall variability due to their dependency on rain associated with flash flood farming (Chinwe, 2010). The ability to deal with these stresses and disturbances while retaining the same basic livelihood and the capacity to cope with rainfall variability needs to be investigated and documented. This is because to develop sound rainfall variability risk management, it is important to understand different coping strategies engaged in by

smallholders with or without external influences or relief measures during prolonged dry spells. Also, through proper understanding of riverine smallholders' combination of coping strategies, appropriate interventions can be designed to complement local coping strategies sustainably.

1.2 Research Objective

To provide insight on interactions of coping strategies among riverine smallholders as a consequence of rainfall variability related threats.

1.3 Research Questions/Sub-Questions

1. How do riverine smallholders perceive and cope with rainfall variability risks?
 - a) What are the main coping strategies employed by riverine households during crisis?
 - b) What reasons bring about the need to engage in certain coping strategies and not others within the same or between households in the same or different wealth groupings (combination of specific strategies)?
 - c) What preparedness coping strategies measures are in place by smallholders?
 - d) To what extent do the coping strategies engaged during rainfall variability stress reduce smallholders' susceptibility to the shock?
 - e) What challenges are faced in successful response to rainfall variability and adoption of the coping strategies?
 - f) What policy mitigation measures have been put in place by the government / NGOs / church necessary for the riverine population to remain viable under rainfall variability situations?

1.4 Research Limitations

- General perception from all socio-economic groups that the study could result into some assistance or incentives given the fact that during the research, the study sites at the time were under intense food insecurity caused by rain failure and surging prices of basic food items resulting in;
 - Well-off and middle households not willing to provide explicit information on their sources of income and assets owned.
 - Poor households with high expectation to receive aid from the researcher or influence their assistance through the findings.
 - General fear from all households registered in organisational relief and development programmes to lose the assistance if the study discovers information contradicting their vulnerabilities.
- The timing of the research coincided with the smallholders' daily activities which at times disrupted the smallholders' schedules or delayed the researcher's appointments in the field.

CHAPTER TWO

2.0 LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Rainfall Variability, Riverine Cultivation and Coping Strategies Concepts

Erratic rainfall is an inherent characteristic of arid and semi-arid agro-ecosystems, limiting land productivity. In Sub-Sahara Africa these areas of predominant rainfed semi-subsistence crop and livestock production, often with marginal inputs, continue to experience low yields (Singh, et al., 2009). According to Meier, Bond and Bond (2007), recent food shortages in sub-Sahara African region have been linked to rainfall variability as most production systems are subsistence oriented and are dependent on climatic conditions. Droughts and floods have become a common feature and the local capacities to cope with these phenomena have been eroded over time. Inter-annual variability of rainfall has been increasing and the chances of drought in parts of the Greater Horn of Africa have doubled from one in five years to one in three years.

The arid and semi-arid lands are characterized by highly variable rainfall in space and time limiting potential crop yields in these areas (Graef and Haigis, 2001). The high degree of rainfall variability, when combined with relatively low asset base of most rural households, restricts household crop management strategies and overall crop water productivity. As smallholder farmers in Sub-Saharan Africa practice rainfed agriculture, they are therefore at high risk of crop failure given the erratic nature of the rains. Farmers in the arid and semi-arid areas practice subsistence agriculture and their ability in achieving yields high enough to ensure household food security has been hampered by rainfall irregularities (Masvaya, Mupangwa and Twomlow, 2008).

Arid and semi-arid lands cover 40% of the earth surface on which over one billion people depend for their livelihoods and two thirds of the African continent is dry and is home to more than 50 million people. Agriculture in arid and semi-arid lands of Kenya depends on seasonal characteristics of rainfall where 80 per cent of the Kenyan landmass is arid and semi-arid and most of the inhabitants are pastoralists who are dependent on the natural environment for their survival. These areas are home to approximately over 10 million people which are a third of Kenya's population (Galvin, et al., 2004).

2.2 Definition of Riverine Cultivation

Smallholder riverine agriculture is used generally to describe rural producers who largely utilize family labour for their farm production along main rivers and have a direct reliance on farm produce for their subsistence requirements (Ojwang, Agatsiva and Situma, 2010). They are further distinguished by their low level of productivity, absence of farm mechanisation and a low degree of crop specialisation.

Riverine cultivation has been defined by Sage and Majid (2002) as households whose domestic production is derived exclusively from farming and who do not maintain livestock holdings.

Matsuda (1996) defines riverine cultivation as a farming system utilizing the difference between water and levels in the rainy and dry season to grow crops on the riverbank slopes. At the same time, a farming system that cultivates land after a flood (which may be called flood recession

agriculture) including riverbank cultivation can be found widely in arid and semi-arid regions of Africa.

For the purpose of this study, riverine cultivation is defined as a farming system that utilizes rain and river flash flood water and whose households maintain a limited number of small ruminants (sheep, goat) and big livestock (camel, cow, and donkey) in a permanent settlement.

2.3 Definition of Coping Strategies

Households have coped with climate trends and shocks for decades and some rural households in dry land areas have even moved away from climate dependency in their livelihood strategies. This provides evidence that, despite being vulnerable to climate change impacts, households and riverine smallholders are not helpless victims (Nielsen and Reenberg, 2010).

Following different climate uncertainties experienced overtime, diverse definitions of coping strategies have been put forth by different writers.

According to Davies (1993), coping strategies is a short term response in securing the livelihood system to periodic stress. These represent actual measures to adjust the event that occurred.

Coping strategies are remedial actions undertaken by people whose survival and livelihoods have been compromised or threatened (WHO, 1998). Snel and Staring (2001) use the term coping strategies to refer to all strategically actions that individuals and households in a poor socio-economic situation use to restrict their expenses or earn some extra income to enable them to pay for the basic necessities and not fall too far below their society's level of welfare. Coping strategies are thus series of strategic acts based on a conscious assessment of alternative plans of action by the affected households. Within the limited options they sometimes have, households in a poor socio-economic position choose the plans of action that are proportionately the most useful to them. This does not necessarily mean that these plans of action always serve the purpose they were intended to serve.

Holzmann (2003) delineates coping strategies as strategies designed to relieve the impact of the risk once it has occurred. The main forms of coping consist of individual dis-saving/borrowing, migration, selling labour, reduction of food intake, or the reliance on public or private transfers. Coping means managing of resources in difficult situations. It includes finding ways to solve problems, to handle stress, or to develop defence mechanisms. This involves no more than managing resources in unusual, abnormal and adverse situations; this can include preparation, mitigation and response or rehabilitation measures (Bhrami and Phoumphone, 2002).

Kivaria (2007) describes coping strategies as responses of an individual, group or society to challenging situations. The coping strategies live within the framework of individuals, groups or society's risk aversion or tolerance level, that is, they are instituted to minimize risk or to manage loss. While some coping strategies may be brought into play by a stress factor, other coping strategies may be an intensification of an already inbuilt strategy.

Eriksen, Brown and Kelly (2005) in their study described coping strategies are principal and complementary. According to them, households generally cope by engaging in a few farming activities, which was one principal activity or a multitude of less favored activities that often complement each other. The household seek one principal coping strategy, which can substitute

for farming as well as a major regular source of food or income earner for food and other expenses and to switch to complementary activities if the principal activity failed. For this reason, households switch between different complementary activities during the course of the crisis as opportunities arose or constraints make particular activities unviable.

For the purpose of this research, coping strategies are defined as activities aimed at obtaining food or income during times of rainfall related threats, either through production or through formal and informal exchange, own labour, transfers and claims.

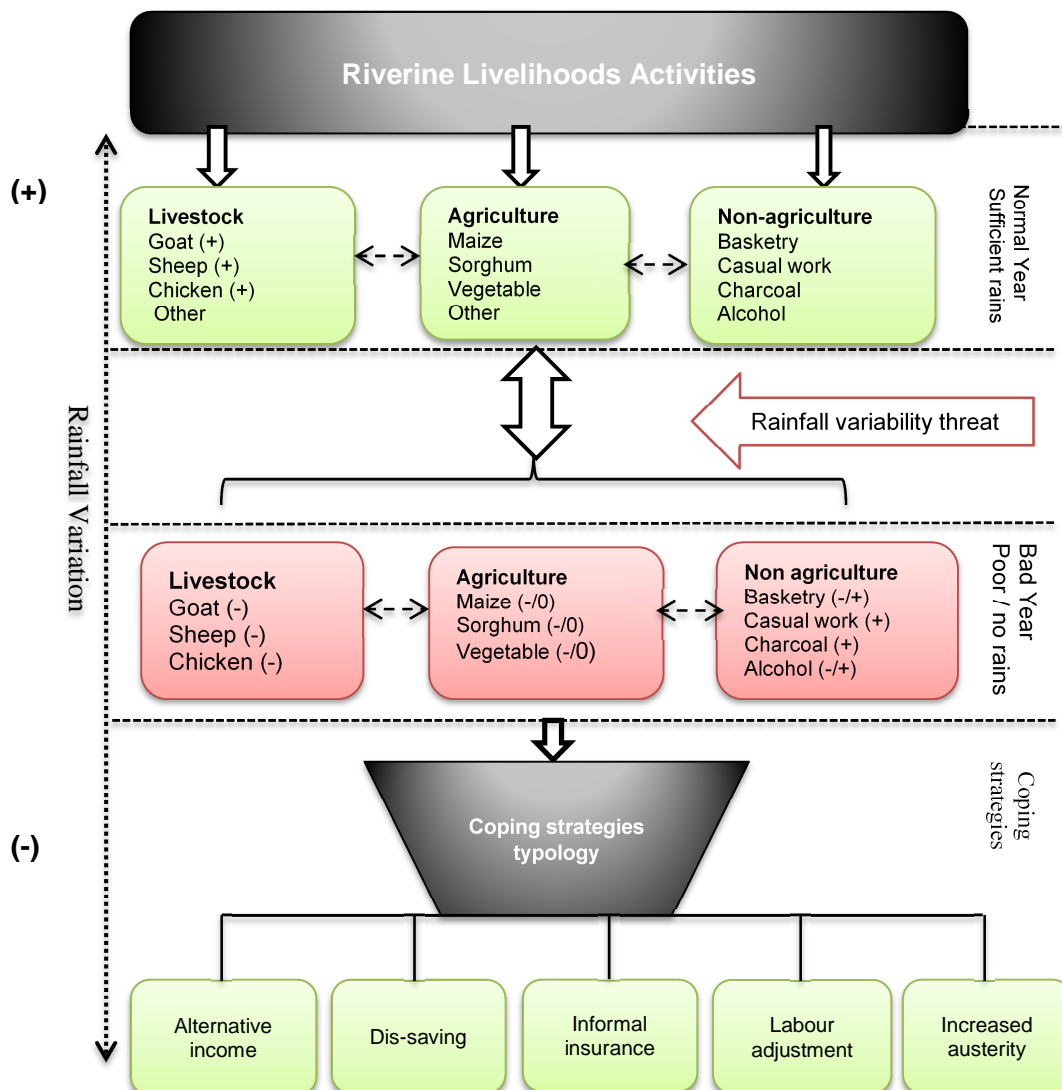


Figure 1: Schematic framework of coping strategies to rainfall adversities

Normal year: For the purpose of this research a normal year refers to the year when there is adequate amount of rainfall for crop production, no floods and absence of diseases / insects pest infestations. These translate to sufficient crop food production to meet household food consumption for at least eight (8) months (Kelbessa, 2007).

Bad year: A bad year on the other hand refers to the year when there is shortage and/or poor rainfall and/or late onset of rainfall with serious diseases and insects pest infestations. These translate to drying up of crops and/or premature harvest (green harvest for the case of maize & sorghum). Basically nothing is directly stored and the harvest may support some households for 1 to 2 months only or just few weeks for poor households (Kelbessa, 2007).

2.4 Overview of Types and Classification of Coping Strategies

There are numerous classifications and typologies of coping strategies in the literature, for instance Mingione (1987), makes a rough distinction between coping strategies focused on making better use of internal household resources and coping strategies focused on mobilizing external resources provided by the state, local community, relatives, friends, private organisations including the church and Non-governmental organisation. Snel and Staring (2001) have discussed both the strategies and have made a distinction between monetary and non-monetary resources. According to the duo, monetary resources include earnings from formal or informal labour of financial support provided by the local or national authorities whereas non-monetary resources include activities by household members to meet their own needs, informal relations of mutual support or exchange of services and goods supplied by official agencies.

According to Takasaki, Barham and Coomes (2002), coping strategies related to rainfall related threats have been categorized into five types as shown in the schematic framework in figure 1 above:

1. Collection of natural resources for alternative income or food (charcoal production, firewood collection, wild foods)
2. Drawing down of food stock and sale of assets (livestock, radio, motorbikes)
3. Informal insurance mechanism (exchange, remittances, borrowing and relief aid)
4. Labour adjustment (increased child labour, taking children out of school)
5. Increased austerity (meal reduction in quantity and frequency, reduction of family size by sending children to relatives/neighbours)

According to Kinsey, et al. (1998), when a large negative shock occurs, the usual household activities may not yield sufficient income. Studies have reported high income variability related to risks of various forms associated with fluctuations in crop yields. If all the households in a community, district or region are affected, local income-earning activities are likely not to be available or sufficient. In this case, relying on the support of family members or others may not be possible unless they have migrated and can contribute with remittances. In such a situation, formal or informal insurance transfers (credit or insurance) from outside the community are necessary, while inter-temporal transfers (e.g. the depletion of individual or community-level savings) are also possible. Besides seeking assistance, households may also pursue other activities as part of their coping strategies. Many examples, including temporary migration to find jobs, longer workdays, collecting wild foods and collecting forest products for sale are reported (Thornton, et al., 2007; Davies, 1996).

A number of coping responses that vulnerable smallholders' households employ are preventive to survive an uninsured climate shock that can have adverse, long-term livelihood consequences. These are coping strategies that include liquidating productive assets, defaulting on loans, migration, withdrawing children from school to work on farm or tend livestock, severely reducing nutrient intake and over-exploiting natural resources, even permanent abandonment of farms and

migration to urban centers, sacrifice capacity to build a better life in the future (Brown and Hansen, 2008). Understanding this pattern is important if external support is to complement local coping strategies. Non-farm income generating activities are therefore critical to people's survival, both during certainty and non-uncertainty periods.

Over time, rural households develop a range of coping strategies as a buffer against uncertainties in their rural production induced by annual variations in rainfall combined with socio-economic drivers of change (Cooper, et al., 2008). These coping strategies spread risk and aim to reduce the negative impacts on household welfare from income shocks due to harvest failures. Coping strategies may be preventive strategies including altering planting dates, introducing other crops and making investments of water equipment, or may be in-season adjustments in the form of management responses. They may be reactive strategies used after the negative impacts or the so-called shock due to harvest failure. The latter most often include consumption smoothing, the sale of assets including livestock, remittances from family members outside the household and income from casual employment (Niimi, et al., 2009). It has also been reasoned that coping strategies for small rural households vary both between households and over time according to preferences, objectives, and the capacity to change. Coping strategies vary by region, community, social group, household, gender, age, season and time in history. They are deeply influenced by the people's previous experience (WHO, 1998). The capacity to change includes financial and technological issues as well as the willingness to change traditional thinking.

In the event of stresses or disturbances in the system, populations tend to respond by use of possible strategies to reduce the vulnerability. The fact remains that people facing a food shortage make strategic decisions about how to bridge their consumption deficit (Seaman, 1993). Davies (1996) sees coping strategies as 'designed to preserve livelihoods', which might incorporate food consumption rationing to protect future livelihoods. Another way of looking at this distinction is as a choice between 'erosive' and 'non erosive' behavior: strategies that draw on additional sources of food and income and do not undermine livelihoods are 'non erosive', while strategies that deplete the household's asset base and thereby undermine its future viability are 'erosive' (Devereux and Maxwell, 2000).

Over generations, and especially in the more arid environments where rainfall variability impacts most strongly on livelihoods, people have developed coping strategies to buffer against the uncertainties induced by year-to-year variation in water supply coupled with the socio-economic drivers that impact on their lives (Cooper, et al., 2008). Whilst such coping strategies have been of greatest importance and have evolved over many generations in the drier and more risk prone environments, they have perhaps only recently gained importance in many of the wetter and more assured environments as a range of factors (population pressure, declining soil fertility, weed invasion, decreasing farm size, disease, lack of markets or access to markets for high value produce, lack of off-farm employment) are resulting in agriculture becoming a less viable foundation for rural livelihoods (Jayne, et al., 2003).

Slater, et al. (2007) share the above sentiments and they project that by the end of the 21st century, the impact of rainfall variability will have substantial impact on agricultural production and consequently influencing negatively the scope of reducing poverty in Sub Saharan Africa, where the majority of the population reside in rural areas and depend on smallholder agriculture for their livelihood. Environmental change emerging through the driver of climate change could inflict harsh and extreme environmental conditions upon rural smallholder farmers and therefore has

direct implications for creating unsustainable livelihoods and or reduce the livelihood options of poor farm households, especially within the agricultural and livestock sector. Such a scenario could thereby exacerbate existing patterns of poverty and undermine policy attempts towards poverty alleviation and improvement in household well-being (Brown and Crawford, 2008).

According to Ojwang, Agatsiva and Situma (2010), the smallholders of the dry lands and semi-arid lands in Kenya engage in the following major element of coping to avert rainfall variability.

1. Making use of biodiversity in cultivated crops and wild plants. The smallholders get involved in intercropping of several crops.
2. Integration of livestock keeping into family farming systems. This ensures easy availability of food needs e.g. milk and meat, as well as cash from livestock sale in case of crop failure
3. On farm storage of food during good harvest to be used during crop failure or bad harvest.
4. Diversifying livelihoods to prevent negative food availability effects by engaging in other income sources to compensate for the reduced availability of own produced food.

Corbett (1988) in his case studies cites that risks to food security due to climate related shocks are frequently anticipated by the community as well as at household level and that coping strategies are carefully planned to cope with the shocks. The decision by the household to cope with these shocks are determined after consideration of resources that are available to the household or even the community, current and expected food prices and seasonal opportunities for wage employment and the collection of the wild foods. Studies have shown that riverine smallholders that live in conditions that put their main sources of income at recurrent risk, for example smallholders living in erratic and unreliable rainfall prone areas, will develop self-insurance strategies to minimise the risks to their food security and livelihoods. This may involve accumulating of assets in a good harvest seasons which are then disposed of in lean years, patterns of migration to seek employment in distant labour markets and the development of systems of reciprocal obligation among households which result in flows of food and other resources during crisis periods.

CHAPTER THREE

3.0 RESEARCH STRATEGY AND METHODOLOGY

3.1 Study Area Description

The study was conducted in Turkana County located in the North western part of Kenya and covers an area of 77,000 sq. km with a population of 855,399 people according to 2009 population census projections. The County exhibit both arid and semi-arid lands (ASAL). Turkana was recently subdivided into six administrative districts namely Turkana East, Turkana South, Turkana Central, Loima, Turkana North and Turkana West. This study was conducted in Kalemunyang and Napeikar in Loima district, Turkwel division. Kalemunyang and Napeikar are located in the south west of Lodwar town with Kalemunyang situated about 74 km away from Lodwar town and Napeikar 15 km away along River Turkwel. Turkana is characterized by a warm and hot climate with a mean temperature of 24 - 38°C. Turkana experiences erratic and unreliable rainfall and its distribution are between April and July for the long rains and between October and November for the short rains. Rainfall ranges between 150-500 mm per annum (GoK-ALRMP, 2008).

The main economic activity is based on extensive livestock production and the source of revenue comes from sale of livestock and their products. Approximately 70% of the population in Turkana county are nomadic or semi nomadic pastoralists. Fishing is also an important activity along the lakeshore. Over the years, fish yields from the lake have been declining due to the drying of the Ferguson gulf and the state of insecurity in Todonyang (the mouth of river Omo). Indigenous fruits/foods are important sources of food, particularly during dry spells. Of the wild fruits, doum palm (Engool) is the most widely used. It is used for basket, brooms and mat making while *Acacia tortilis* (Ewoi) is used for firewood and charcoal production (GoK-ALRMP, 2008).

Subsistence riverine farming is practiced mainly in pockets of arable land within flood plains and along riverine areas. The harvest is dependent largely on the amount of rain realised in a good year, and the volume of water flowing in the two major seasonal rivers of Kerio and Turkwel. Rainfed farming is also practiced within the County at low levels. Farming is mostly practiced in six out of seventeen divisions namely Turkwel, Katilu, Lokori, Central, Kainuk and Kerio divisions in Turkana. Other crops grown under small scale flash flood irrigation along the riverine are mangoes, tomatoes, cow peas, green grams, bananas, sugar cane, paw paws and water melons. A part from the high temperatures and persistent rainfall variability in addition to prolonged droughts, other non-climate related challenges in agricultural sector that also contribute to low production include crop pests and diseases, lack of adequate drought tolerant certified seeds, inadequate extension services, high cost of farm inputs, crop production mainly done at peasantry level (GoK-ALRMP, 2008).

According to Watson and Binsbergen (2008), other key income generating activities include weaving of mats and baskets, production and sale of charcoal, production and sale of local alcohol, engagement in casual labour (construction, fetching water, truck loading/unloading) and petty trade. However, in a bad year characterized by severe rainfall associated stress, the riverine smallholders engage in coping strategies that are meant to buffer them from these stresses through borrowing, reduction in the number and sizes of the meals, sale of water, frequent sale of

small ruminant animals, sale of productive assets (radio, bicycle), begging, increased rural urban migration, consumption of wild fruits and herd splitting. There is also an increase in charcoal burning and firewood selling due to the prevailing drought situation (GoK-ALRMP, 2008).

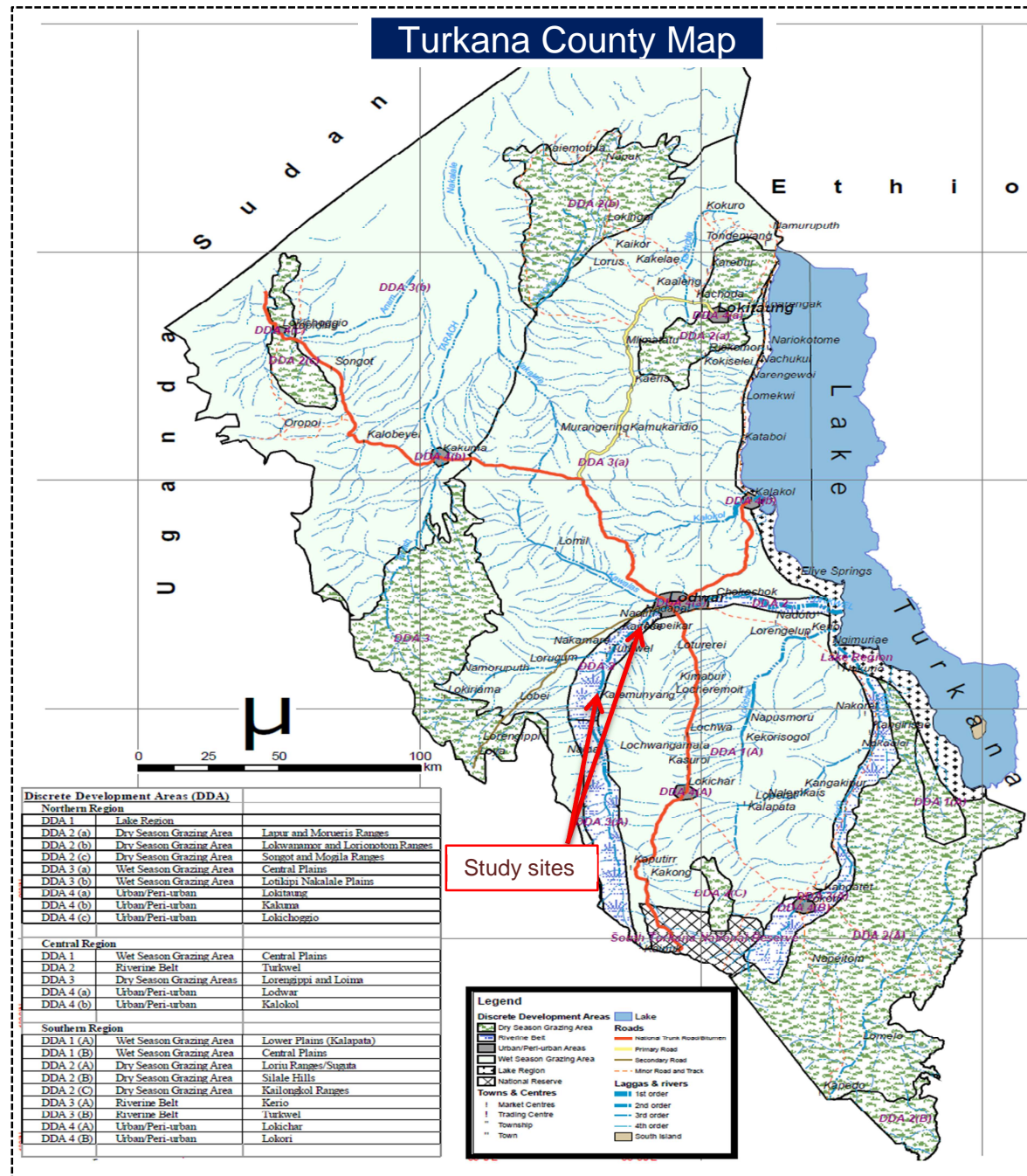


Figure 2: Location of study site, Kalemunyang/Napeikar - Turkana, Kenya

Source: Arid Lands Resource Management project II-Turkana

3.2 Study Design / Strategy

The research focused on qualitative method of data collection combined with secondary information. A case study as the research strategy was preferred because the research desired to get an in-depth layer of coping strategies interactions among riverine smallholders' following rainfall irregularity in the study area. One case study was carried out in Kalemunyang and Napeikar villages herein referred to as clusters. The case study comprised twelve (12) individual households' interviews, four (4) focus group discussions (FGD) and three (3) key informants' interviews (KII). The clusters were selected because they had similar riverine smallholder characteristics though different market penetration and differing proximity to Lodwar main town (Napeikar 15 km away and Kalemunyang 74 km away).

In each of the two clusters, six household heads were selected based on perceived wealth ranking in the locality (well-off, middle, poor). Two household heads, one female headed household and one male headed household, from each socio-economic group in the two clusters were interviewed. Also four focus group discussions (FGD); two from each cluster, one FGD for male and one FGD for female was conducted separately in the two clusters. In the FGD the use of participatory rural appraisal (PRA) tools was explored to facilitate the collection, presentation and analysis of data by smallholders themselves. The selection criterion of respondents' was preferred to help compare the coping strategies used by male and female headed households belonging to the same socio-economic group and between different socio-economic groups.

The three key informants' interviews were conducted with representatives for Arid Lands Resource Management Project (ALRMP), Children's Fund (CF) and World Vision Kenya (WVK) as they were involved in disaster response and mitigation in the study area.

The study started with focus group discussion in order to determine the perceived wealth ranking in the community. This was to ease the selection criteria for the household heads interviewed for the household questionnaire based on the wealth ranking. This was then concluded by key informants' interviews.

3.3 Desk Study

Literature review was conducted with the latest information from the internet websites, formal and informal observations, journals, books, NGOs' grey literature and government latest reports in the study area during research period. The information collected from the desk study confirmed the effect of rainfall variability on indigenous livelihood strategies in the study populations.

3.4 Data Collection

In each cluster, ten (10) days was spent on data collection at the household level as well as from the focus group discussions. Approximately one and half (1½) hours was spent with each individual household including some interruptions here and there. Some of these interruptions included respondents attending to local brew customers, chasing of wandering goats entering the farm among others. The FGDs took approximately two (2) hours each and the key informants' interviews took six (6) days in total with each session taking one hour. Data collection was self-administered by the researcher in the two clusters by use of semi-structured questionnaire / checklists.

A total of four (4) focus group discussions were organised, each comprising ten (10) persons. In each of the two clusters, one FGD for men and one FGD for women were conducted. This was done to elicit information on determinants of wealth ranking, understanding of rainfall trends and perceptions about the changes in the rainfall pattern in the last 10 years, the effect of rainfall threats on smallholders and their household, main livelihoods activities, coping strategies in response to disturbances including reasons for engaging in coping strategies and its advantages, disadvantages, strong points or weak points of different coping strategies options within and between socio-economic groups of households. Also information about the organisations aid during rainfall crisis, effectiveness of external support to smallholders' vulnerabilities, smallholders preferred interventions and knowledge about seasonal calendar of agricultural activities were collected.

To help collect more information from respondents during FGD, PRA tools including wealth ranking was used to find out the socio-economic ranking status of different smallholders and what makes one group different from the other within and between ranks. The study also explored the use of seasonal calendar to determine smallholders' knowledge on seasonal activities and their preparedness to rainfall variability threats.

The selection of the twelve household questionnaire respondents in the two clusters was predetermined by use of wealth ranking during focus group discussions. Households head in each socio-economic group volunteered to be interviewed. The household questionnaire contained three categories of questions. The first category was questions on main sources of livelihoods for riverine smallholders, other sources of income. The second category was questions on changes in the rainfall pattern and perceptions to changes. The third category was questions related to reasons for engaging in certain coping strategies, advantages, disadvantages, strong points or weak points of different coping strategies options within and between wealth ranks households, effectiveness of the coping strategies to the shock, constraints limiting successful coping, which organisations did assist, what type of assistance they did provide and if the assistance was helpful and households preparedness to rainfall shocks.

Key informant interviews were organized in the County headquarters in Lodwar town with relevant institutions. Representatives of three organisations were interviewed including an interview with the County food for asset coordinator for Arid Lands Resource Management Project, a government line department; then representatives of organisations involved in disaster response, management and preparedness, that is, the Programme Manager for Child Fund and the food security Coordinator for World Vision Kenya respectively. The main focus for these interviews was to explore the rainfall variability risk management approaches that have been put in place by the government / NGOs. The interviews focused on how long the organisation has been working in the area, types of interventions, main constraints limiting their interventions, their understanding of contributing factors to vulnerabilities to the riverine populations, awareness of organisation to indigenous coping strategies and their forecast on future assistance.

Table 1: Data collection strategy

Activity	Selection	Research Location		Topic, Focus of Activity
		Napeikar	Kalemunyang	
Semi structured interviews and open ended discussion <u>Summary</u> (12 interviews)	12 Household heads from poor, middle and well-off socio-economic status	6 Household heads in the sites (3 male & 3 female)	6 Household heads in the sites (3 male & 3 female)	Sources of income in a normal year, sources of income in a bad year, external support, coping strategies and reasons for choice.
Focus Group Discussion (FGD) <u>Summary</u> (4 FGDs)	2 women FGD of 10 people, 2 men FGD of 10 people, including local officials and leaders separated by gender	Two FGDs (one men and one women) in Napeikar	Two FGDs (one men and one women) in Kalemunyang	Local pattern of coping strategies in responses to rainfall variability, understanding of rainfall trends, external support.
PRA Tools	As in FGD	Two FGD with male and female separately	Two FGD with male and female separately	Wealth ranking and seasonal calendar
Key Informants Interviews <u>Summary</u> (3 interviews)	NGOs and Government personnel working in the areas	ALRMP, CF and WVK	ALRMP, CF and WVK	Contextual Information on development and policies, responses on rainfall variability, mitigation measures put in place

3.5 Data Analysis

The qualitative data collected from the case study was presented and analysed by use of simple descriptive data (tables and figures). The smallholders were divided into three wealth groups (well-off, middle, and poor) according to clusters to be able to compare a number of different coping strategies employed by each household in the different socio-economic groups within the same cluster as well as between the two research clusters. The focus group discussions, key informants' interviews and PRA tools of wealth ranking and seasonal calendar were used to substantiate the information collected at the household level. The results from the field was interpreted and compared with the literature collected during the desk study as provided in the schematic framework illustrated in figure 1. The research framework was used to group coping strategies pursued by different socio-economic groups of riverine smallholders segregated by gender.

CHAPTER FOUR

4.0 RESULTS

4.1 Riverine Smallholders Sources of Livelihoods

During a FGD with male and female headed households separately, Kalemunyang and Napeikar riverine smallholders stated that they determine socio-economic status according to the number of livestock owned (goats, sheep, cows, camel, donkey, and chicken), size of land cultivated, size of business operated and asset possessed. Wealth ranking exercise with male and female FGD was conducted to find out the measure of each wealth ranking determinants. This was done to distinguish and rank the resident of the two clusters as well-off, middle and poor households. This was also done to find out the coping strategies typologies each socio-economic group of riverine smallholders use to cushion themselves against rainfall related threats based on their wealth possessions as shown below.

Table 2: Wealth ranking / stratification of socio-economic groups & gender

	Kalemunyang						Napeikar					
	Male HHH			Female HHH			Male HHH			Female HHH		
Assets	Rich	Middle	Poor	Rich	Middle	poor	Rich	Middle	Poor	Rich	Middle	poor
Goats	20-30	15-20	2 -5	20-25	6-10	2	10-25	10-15	0	10-15	5-10	4
Sheep	5-10	3-5	1-3	5	2-4	0	5-8	1-5	0	1 -3	0 -2	0
Cows	0	0	0	0	0	0	0	0	0	0	0	0
Camel	1-5	0	0	2	0	0	1	0	0	0	0	0
Donkey	1-2	1	0	0	0	0	1	1	0	0	0	0
Chicken	10-15	5-10	0	15-20	4-10	2-4	0	5-10	0	15-20	0	0
Land size (acres)	2	1	1	1	1	1	1.5	0.5	0.5	0.5	0.5	0.5
Business (KES)	30,000	5000 - 10,000	0	20,000	10,000	0	10,000	0	0	0	4,000	0

The number of livestock owned, size of business owned and the area of land cultivated were the main three determinants of social grouping in the two study clusters. It was reported that different socio-economic groups approached crisis differently in the initial stages of rainfall adversity.

The study established that riverine farming and livestock keeping (mainly goats) were mentioned by both well-off male and female households as the principal sources of livelihood; Vending sugar and maize flour, charcoal production for sale and mat weaving were mentioned by both middle socio-economic groups; while the poor households, both male and female, declared riverine farming as their principal livelihood source of income in the two study clusters. Other supplementary income activities mentioned are shown in table 3 below segregated by gender.

Table 3: Main sources of Riverine livelihoods and other income activities by gender

HH status	Kalemunyang		Napeikar	
	Main source of income	Other sources income	Main source of income	Other sources income
Well-off male	- Keeping of livestock - Riverine farming	- Trading on livestock	- Riverine farming - livestock keeping	- Vending sugar and maize flour
Well-off female	- Riverine farming - Keeping of livestock	- Charcoal production and sale	- Riverine farming	- Petty trade on livestock, mats & food stuff
Middle male	- Riverine farming - Keeping of livestock	- vending on maize flour and sugar - Mat weaving for sale	- Livestock keeping - small scale business (sugar & maize flour)	- Riverine farming - Mat weaving
Middle female	- Riverine farming	- Brewing of local alcohol - Sale of charcoal	- Petty trade on maize flour, beans and sugar	- Riverine farming
Poor male	- Riverine farming - Tobacco vending	- Sale of charcoal (wife) - Sale of firewood (wife) - Brewing of local alcohol	- Riverine farming	- Sale of charcoal - Sale of palm leaves, fruits
Poor female	- Riverine farming	- Sale of charcoal - sale of firewood	- Mat making - Riverine farming	- Sale of charcoal

Looking at table 3 above, there was not much difference in sources of income pursued by different socio-economic groups by gender in the two clusters of study.

Seasonal Calendar: It was reported during the FGD that weather conditions determine various timing of activities of smallholders. Smallholders in Kalemunyang reported starting canal desilting in December up to February then followed by ploughing in March. They reported growing maize and sorghum once a season, though sorghum ratoons was mentioned as second harvest in September. In Napeikar, canal desilting started in November up to February. First ploughing took place in March and maize was said to be the main crop, cultivated twice a year because of the market availability in Lodwar town (refer Annex 2/3).

4.2 Rainfall Variability Perception by Riverine Smallholders

Riverine smallholders strongly perceived that rainfall has decreased in amount, widened in spacing and shortened in length with the length of the wet season which was traditionally expected to start in March to July has decreased, and in the last ten years rainfall has been varying from year to year (**refer annex 4**). The shortened length of the wet season has ensured that there are prolonged dry spell and riverine smallholders think that this has severely affected availability of water for crops and livestock pasture as there is not enough time for recovery.

During the FGD and the individual household interviews, smallholders gave different views on the cause of rainfall variability but with a converging views pointing at traditional beliefs and ritual bound. In both clusters, with exception of one respondent, the most important reason offered for the cause of rainfall variability was penalty from God. The respondents reasoned that people have

deviated from God's teachings and the way of living. The reason given for this perception was attributed to people's deviation from traditions and norms.

It was stated that moral values are on the verge of collapse. They mentioned that traditional elders used to offer respects to their seniors, a thing that does not exist at the moment. The traditions and norms cited were abandonment of traditional prayers by the elders; restrain from appeasing God through sacrifices and involvement of rainmakers into illicit actions including drinking of alcohol and committing adultery. The respondents alleged that the current generations have no respect to traditions, cultural values and customary law. Absence of respect on traditional values was cited to have been construed to cause rainfall variability and other bad omens in the area.

According to FGD respondents, in the past, when rainfall delayed or did not fall at all, elderly men and rainmakers gathered under a particular Acacia tree (Ewoi/Esanyanait), slaughtered fat and young rams and bulls which were then roasted. This was done to forward their request to God and ancestral spirits to grant them rain when there was prolonged dry spell. According to the interviewees, thank giving was a powerful tool to request for rain and this was so helpful because rainfall was prompt. The rainfall ceremonies have vanished or have become futile because of declining moral values and deviation from God norms, a thing that is believed to haunt the current generation and even the one to come.

One male respondent mentioned that population pressure on limited natural resources i.e. woodland reserve depletion for income generation activities, settlement and land for cultivation was the cause of rainfall variability. The respondent had this to say 'People have cut trees over the last many years and they are still cutting them for many reasons and people do not replant them. For these reasons, land had become bare resulting in low rainfall as it used not to be when the population was low thirty years ago'.

4.3 Coping Strategies

Riverine smallholders engage in various coping strategies to buffer rainfall variability. During the FGD with male and female groups as well as individual household interviews, coping strategies to protect against rainfall related risk discussed included; Food for asset (FFA), sale of assets, relief food, increased consumption of wild foods, sending children to relatives/neighbours, increased charcoal production, borrowing from friends/neighbours, credit from money lenders/traders, increased brewing of local alcohol, reduction of daily meals in amount and frequency, seasonal migration, casual work, and lagoon gardening (Amukololo) among others (refer table 4).

The study has shown that there are similar and different coping strategies for well-off male, middle, poor and well-off female, middle and poor respondents in the two clusters. These coping strategies were grouped in reference to figure 1;

1. Collection of natural resources for alternative income/food (charcoal production, wild foods)
2. Drawing down of food stock and sale of assets
3. Informal insurance mechanism (gift exchange, remittances, borrowing and relief aid)
4. Labour adjustment (increased child labour, taking children out of school)
5. Increased austerity (meal reduction in quantity and frequency, reduction of family size by sending children to relatives/neighbours)

4.3.1 Alternative Income / Food

4.3.1.1 Wild Foods

All socio-economic groups acknowledged gathering of wild food even in a normal year but the extent and variety differed greatly between well-off and poor households. The demand of wild food as source of food during period of crisis was reported doubled as wild food formed a significant part of the diet for poor households while well-off households ate them to supplement their diet. The most common reported wild foods eaten were *Cordia sinensis* (Edome), doum palm (Engool) and *Salvadora persica* (Esekon). Engool and Edome were reported by the smallholders to have side effect if eaten alone in large quantities. However, smallholders reported that whatever side effect the wild foods could have to their health, they claimed that wild food played a crucial role in the poor household diet during the period of starvation and therefore cannot be underestimated. Of all the wild foods cited, Engool was said played an important role as a coping strategy because it was reported to be available in the study area both in the wet and dry spell season. As indigenous plants they were more readily able to withstand excessive low rainfall than most of the crops that were locally grown.

It was reported by all socio-economic groups that collection of wild food had some constraints, which included distance from the homesteads; lack of access due to insecurity; shortage of water for proper plants growth and lack of knowledge of their availability and safe usage by some households.



Figure 3: Photo of women eating *Salvadora persica* fruits (Esekon) in Kalemunyang

4.3.1.2 Collection of Palm Leaves for Thatching Huts

Poor female households reported having engaged in palm leaves collection for sale, used for thatching huts. Sometime the leaves were collected on request where poor households did both the collection and the thatching altogether. During prolonged dry spell, many people pursued the same coping strategy making it difficult to collect enough leaves and obtain good amount of money. Both poor and middle households in Kalemunyang and Napeikar claimed collecting leaves and made ropes out of it for sale. It was reported that processing and making of rope was rather difficult and required a lot of competence.

4.3.1.3 Brewing of Local Alcohol

Both the middle and the poor female household reported brewing of alcohol being a means of living even in a normal year. On the other hand, this becomes increasingly a coping mechanism during period of crisis. Contrary, the female middle and poor households reported high prices of the brew ingredients (sugar and flour) during the dry spell, which discouraged some households from the strategy resorting to another strategy. It was also mentioned that the alcohol ingredients requirement competed with the household food requirement making hard to strike the balance. Nevertheless, the brewing of local alcohol was mentioned as a double strategy because it was reported that the family earns the income from the sales as well as consumes the leftovers locally known as 'Adakae'.

4.3.1.4 Firewood Collection and Charcoal Sale

The study revealed that sale of firewood and charcoal was heavily relied upon by poor male and female household for their living in a normal year and doubled in a crisis year as a coping mechanism to compensate other lost forms of income sources. Smallholders reported restriction on firewood/poles and charcoal collection by the government in the bid to conserve the environment. This had restricted the amount of firewood/charcoal the smallholders could sell; at the same time market for charcoal was understood to be a challenge because of lack of transport to take it to the main towns.

4.3.2 Dis-savings (Drawing Down Shop Stocks, Sale of Assets)

4.3.2.1 Reduction of Assets

The findings from all well-off households in the two clusters and poor female in Napeikar claimed sale of assets as their important coping strategy during high rainfall variability shock. They claimed that sale of assets was not a wise decision but helped them to protect lives. The most common asset sold by these socio-economic groups was livestock. The term of trade for livestock was reported to decline during these periods due to an increase in the sale of livestock leading to lower exchange entitlements. Sale of livestock was considered a last resort.



Figure 4: A group of riverine smallholders with goats at the sale yard

4.3.2.2 Drawing Down of Shop Stock

The study showed that out of the three respondents, who reported drawing down shop stocks during period of crisis, one middle female was from Napeikar and the other two; one well-off male and middle female were from Kalemunyang. The reason mentioned was that during crisis, prices of basic food items skyrocketed and stocks from harvest if any got depleted. The consumption of shop stock without restocking was reported led to shop closure and increased debts on smallholders for lack of returns to repay back the loans for households that had secured the capital from the loan.

4.3.3 Informal Insurance Mechanism / External Support

4.3.3.1 Food for Asset / Relief Food

All socio-economic groups interviewed reported receiving support from the government and non-governmental organisations during period of rainfall shock in form of relief supplies or through the food for asset programme. The food for asset programme was meant to enhance self-production through excavation of canal for furrow irrigation. Food for asset programme according to the respondents was not viable for the physically challenged and the elderly people who could not perform physical work.



Figure 5: A women carry away food aid in form of food for Asset

4.3.3.2 Local Credit and Exchange System

Respondents in a FGD in Napeikar mentioned being engaged in credit from moneylenders to buy basic food items and sometime in the form of grains from shopkeepers and neighbours during the period of crisis. The grains borrowed were repaid back the next harvest or in cash at borrowing time market price. The money borrowed from moneylenders attracted high interest rate, which the respondents lamented. Grains credit was said to be diminishing with worsening rain failure and there were no ready traders to offer the service. Well-off male household though reported having engaged in exchange of goats with grain in better areas.

4.3.3.3 Migration

The middle and poor male households in Kalemunyang and one middle male in Napeikar claimed that during severe dry spell crisis, the young members of poor household migrated temporally to look for casual manual work (watchman, fetching water) in the nearby urban centres. This was easy for Napeikar household that reside only 15 KM from the main Lodwar town. However, the respondents in Kalemunyang regretted that due to lack of transport and jobs scarcity, seasonal migration had reduced and people worked in well-off homes in the village as pit latrine diggers, water vendors. It was reported that some households whose members migrate to urban centres sent remittances to their kinsmen as external support.

4.3.4 Labour Adjustment (Increased Child Labour, Taking Children Out of School)

Reduction of the Household Size: The poor male households in both clusters disclosed the changes in the household size by reducing the number of consumers. This was done to reduce the household size towards smaller consumption unit. This was achieved by sending children to relatives, sometimes sending children to work in neighbours homes as housemaids/baby sitters as they eat. It was reported that when children are sent to relatives/neighbours, most of them abandoned school and engaged in survival errands in exchange for food.

4.3.5 Increased Austerity (Meal Reduction in Quantity and Frequency)

4.3.5.1 Meal Reduction in Quantity and Frequency

The study findings revealed that all socio-economic groups either reduced or skipped meals during harsh food shortage. Poor households reported skipping meals due to complete exhaustion of food stocks while middle and well-off households reduced meals in quantity and frequency to make food last for a long time. Preference was given to children and the elderly persons in the household when food was available. The study revealed that eating less food by the middle and well-off households or skipping of meals by poor households subjected household's members to physical weakness which exposed them to nutritional and health hazards.

4.3.5.2 Household Sharing Network

Sharing of food with nearby relatives or neighbours was reported by one well-off male in Napeikar and one poor male in Kalemunyang to be a coping mechanism. This applied when relatives lived in relatively better area. The man/women approached relatives for food or part of the harvest (awote). In certain cases, a family member could be given a goat which can be sold or slaughtered and consumed. Other form of sharing network reported was sending children to neighbours/relatives for the entire crisis season. The reason given for this strategy was to avoid consumption of the household food reserve by receiving from relatives during the period of crisis. During widespread rainfall failure, this coping strategy was reported to be under pressure everywhere and all socio-economic groups get affected equally hence one cannot depend on household network for food sharing because of its unviability.

4.3.5.3 Lagoon cropping by use of hand dug wells (Amukololo)

One middle female and one poor female household in Kalemunyang reported relying on lagoon cropping where small gardens are created inside the river bed adjacent to where river water flow receded. It was found that during a severe dry spell, drought resistant crops (cow peas, sorghum and early maturing maize) were grown and watered through hand dug well. The harvest from the crops was mainly for household consumption and some sold to settle medical bills and pay school for their children. It was reported that this coping mechanism was not reliable on prolonged dry spell as it involves a lot of physical work and prone to human and other predators.



Figure 6: A photo of a woman drawing water from hand dug well for lagoon cropping

Table 4: Summary of coping strategies in the study areas by socio-economic status and gender

Male	Well-off	Middle	Poor
Kalemunyang	<ul style="list-style-type: none"> • Drawing down shop stock. • One meal in a day • Consumption of wild foods • Sale of livestock • Food for Asset 	<ul style="list-style-type: none"> • Increased charcoal production • Increased firewood collection • Increased wild food consumption • Brewing of alcohol • Casual work • Mat weaving • Migration (seasonal) • one meal/day - with children prioritized • Food for asset 	<ul style="list-style-type: none"> • Increased brewing of alcohol • Increased firewood / charcoal production • Borrowing/sharing with friends/relatives • Harvesting of doum palm fruit • Seasonal migration • Casual work in neighbours (fetching water) • Children sent to relatives/neighbours • Skip meals sometime • Food for work
Napeikar	<ul style="list-style-type: none"> • Credit from money lenders • Exchange of livestock for food • Borrowing/sharing with friends/relatives • Food for asset • Consumption of wild fruits • Sale of livestock 	<ul style="list-style-type: none"> • Consumption/sale of livestock • Relief food • Feed on the shop stock • Consumption of wild fruits • Seasonal migration 	<ul style="list-style-type: none"> • Increased wild fruits consumption • Increased charcoal production • Children send to neighbours • Food for asset
Female	Well-off	Middle	Poor
Kalemunyang	<ul style="list-style-type: none"> • One meals a day (dinner) • Food for asset • Collecting of wild foods • Sale of asset (radio, bicycle) • Brewing of alcohol 	<ul style="list-style-type: none"> • Feeding on business stock • Increased mat production • Increased charcoal production • one meal/day • Food for asset • Lagoon cropping • Increased consumption of wild fruits • Cutting of poles for sale 	<ul style="list-style-type: none"> • Increased charcoal production • Lagoon cropping • Increased sale of firewood • Consumption of wild fruits • Skip meals • Food for asset • Casual work at neighbours home (fetching water, thatching) • Sale livestock (goats)
Napeikar	<ul style="list-style-type: none"> • Sale of livestock • 2 meals a day (breakfast and dinner) • Food for asset 	<ul style="list-style-type: none"> • Increased mat production • one meal/day • increased consumption of wild foods • Food for asset 	<ul style="list-style-type: none"> • Sale livestock (goats) • Consumption of wild fruits • Increased charcoal production • Food for asset

From table 4 above reduction of meals, food for asset and consumption of wild foods was a general strategy for all socio-economic groups to reduce rainfall adversity and minimize food and income depletion. The study revealed that most well-off households were more involved on the sale of livestock. Majority of middle households engaged more often in increased

charcoal/firewood sale, brewing of alcohol and handcrafts. The poor households from the table dominated increased charcoal/firewood collection and casual work.

Two male respondents from Kalemunyang reported seasonal migration to urban towns in search for casual work compared to one middle male from Napeikar. This was said to be because of fewer alternatives source of income in the area.

According to the study, male respondents rated sale of livestock and charcoal production (through wives) as effective coping strategies because they raised money from it that helped to boast petty trade, pay school fees and buy uniform, clothe the family, settle medical bills. Female respondents cited relief food/food for asset and charcoal production as the preferred coping strategies because it saves lives during severe starvation due to rainfall related threats and helped earn income that was used to settle domestic bills.

All socio-economic groups argued that though some coping strategies were rated effective, other strategies listed in table 4 were also useful in mitigating immediate needs. Nonetheless, female poor household argued that all interventions were effective because they saved lives, protected assets and wellbeing of people. The middle and poor households mainly in Kalemunyang engaged in numerous alternative income activities to accrue income that could satisfy the household's needs. This is because the activities pursued were reported unviable and fetched very low returns.

4.4 Limiting Coping Strategies Options for Smallholders

Despite the government of Kenya's effort to offer humanitarian aid and lobby for more NGOs and well-wishers' interventions during period of prolonged dry spell, its administrative offices on the other hand had affected the coping mechanisms mainly for middle and poor households according to the respondents through restriction on collection of firewood, cutting of poles for construction, charcoal burning for sale, cutting of palm leaves for handcraft and houses thatching by the department of forestry and natural resources. The government also through department of police was reported to have restricted brewing of local alcohol.

The following were mentioned being the limiting constraints to successful coping to riverine smallholders' different socio-economic groups in the two study clusters.

Table 5: Limiting option for coping strategies in Kalemunyang and Napeikar

Male	Well Off	Middle	Poor
Kalemunyang	<ul style="list-style-type: none"> • Sale of livestock – low price • Distance to reach wild fruits 	<ul style="list-style-type: none"> • Charcoal / mat making – drop in price, many people engaged • Touting – inconsistent and low commission 	<ul style="list-style-type: none"> • Distance to collect firewood and wild fruits (dour palm fruits) • Escalating commodities prices (sugar and maize flour)
Napeikar	<ul style="list-style-type: none"> • lack of strength to work 	<ul style="list-style-type: none"> • Insufficient water for farming • Loneliness/lack of helpers to pursue businesses and riverine farming • Fluctuating livestock prices 	<ul style="list-style-type: none"> • Restricted charcoal burning

Female	Well Off	Middle	Poor
Kalemunyang	<ul style="list-style-type: none"> Distance to reach wild fruits 	<ul style="list-style-type: none"> No ready market for charcoal Distance to reach wild fruits Government restriction to pursue alcohol, firewood 	<ul style="list-style-type: none"> Government restriction to exploit natural resources Insufficient market for charcoal, firewood, mats Poor wages for casual work
Napeikar	<ul style="list-style-type: none"> Lack of labour to cultivate – no money to hire casual work Lack of proper seeds 	<ul style="list-style-type: none"> High prices for food Persistent drought Insufficient water for farming No market for agric products 	<ul style="list-style-type: none"> singleness

Following the limiting constraints mentioned above, all respondents declared having changed coping strategies from less viable activities to more viable coping strategies except one well-off male in Kalemunyang who had not changed its strategies. For example the poor respondents mentioned having changed their coping strategies from tedious and strenuous activities to lesser tedious ones while the middle changed from less rewarding activities to more rewarding ones in order to meet the immediate family needs. The well-off male/female in Napeikar and the well-off female in Kalemunyang reported having changed coping strategies from unviable strategies to more viable strategies.

Given the rainfall trends in the last ten years and the limited riverine farming coping strategies pursued by smallholders, riverine farming was reported by all the socio-economic groups in both clusters as being unviable as long as rainfall trends remains the same or deteriorate further. According to them, riverine smallholders are at the verge of disappearance and can only subsist if

- Underground water is used for irrigation.
- Other sources of income including IGAs are explored.

With the current rainfall patter and trend, majority of the young people are likely to migrate permanently to urban centres to look for employment because riverine farming is not promising.

4.5 Rainfall Variability Preparedness Coping Strategies

Table 6 shows the preparedness coping strategies cited by smallholders before, during and after rainfall crisis.

Table 6: Preparedness coping strategies used by riverine smallholders in the study clusters

Parameters	Time Frame		
	Before the crisis	During the crisis	After the crisis
Household	<ul style="list-style-type: none"> Stock of cereals, livestock & other assets Off farm and social employment networks Sale of livestock at good price and save the money 	<ul style="list-style-type: none"> Meals reduction in quantity and frequency Casual work in urban centres/well-off homes Migration (seasonal) 	<ul style="list-style-type: none"> Asset sale for cereal purchase Food transfers Migration Employment
Farm	<ul style="list-style-type: none"> Diversified cropping Intercropping Plot fragmentation 	<ul style="list-style-type: none"> Shifting crops between land types 	<ul style="list-style-type: none"> Purchase of improved seeds (drought resistant & early maturing)
Plant	<ul style="list-style-type: none"> Planting of stress/drought resistant crops 	<ul style="list-style-type: none"> Planting of early maturing crops 	

Well-off and middle households reported engaging in preparation strategies to minimize depletion of household asset before, during and after crisis. They do so by sale off livestock, practice intercropping, planting early maturing crops, eating less food and engaging in casual activities. While the poor households because of lack of resources and capacity rarely have preparedness strategies thus engage in survival labour intensity activities.

4.6 Institutions and their Interventions Programmes

The study revealed that a number of institutions were involved in various interventions in the study clusters. Different institutions played different roles based on the level they aim their interventions. During the FGD and the household interviews, the interventions targeted the affected riverine smallholders rather than individual household needs with exception of some cases where targeted food relief distribution was done to single out the most affected households. The following institutions were mentioned having intervened in the study area in the last ten years with their corresponding types of interventions.

Table 7: List of institutions that form main sources of emergencies and support programmes

Institution	Type of intervention	
	Kalemunyang	Napeikar
Turkana Rehabilitation Project (TRP)	<ul style="list-style-type: none"> Food for asset for canal construction Distribution of agricultural tools (digging hoe, spade, rake, panga) Distribution of seeds (maize and sorghum) 	<ul style="list-style-type: none"> No intervention
WFP	<ul style="list-style-type: none"> No intervention 	<ul style="list-style-type: none"> Food for asset for canal construction
Child Fund	<ul style="list-style-type: none"> Food for asset for canal construction Distribution of agricultural tools (digging hoe, wheelbarrow, spade, axe, hack saw, knapsack sprayer) Distribution of seeds and seedlings 	<ul style="list-style-type: none"> No intervention
Oxfam GB	<ul style="list-style-type: none"> Relief food distribution 	<ul style="list-style-type: none"> Food relief distribution
Merlin	<ul style="list-style-type: none"> Unimix (blended Soya beans) and drugs for under 5 children 	<ul style="list-style-type: none"> No intervention
World Vision Kenya	<ul style="list-style-type: none"> Relief food distribution 	<ul style="list-style-type: none"> Putting up the fence. Provision of agricultural tools Relief food distribution Goats restocking Distribution of seeds and seedlings
Arid Lands Resource Management Project	<ul style="list-style-type: none"> Distribution of agricultural tools (digging hoe, spade) 	<ul style="list-style-type: none"> Restocking of goats
VSF-B	<ul style="list-style-type: none"> Goat restocking and community animal health trainings 	<ul style="list-style-type: none"> No intervention
Diocese of Lodwar	<ul style="list-style-type: none"> Construction of the canal intake and canal desilting 	<ul style="list-style-type: none"> No intervention
Kenya Red Cross	<ul style="list-style-type: none"> No intervention 	<ul style="list-style-type: none"> Goat restocking, flood victims

NGOs, the church and the government through TRP were the major mentioned suppliers of relief food to the residents of Kalemunyang and Napeikar. TRP and CF were widely quoted by all the respondents as the main supply of relief food in Kalemunyang cluster whereas World Vision Kenya and WFP was cited by Napeikar respondents as the main supply of food aid. TRP and CF were also cited by Kalemunyang respondents being in front of distributing agricultural tools and seeds/seedlings while WVK was mentioned by Napeikar respondents. According to CF, TRP and WVK, the distribution of seeds and seedlings was meant to enable households that cannot afford to buy seeds. This was done as a risk preparedness management or shock mitigation strategy.

WVK, TRP and CF's interventions for food for asset, distribution of agricultural tools and seeds/seedlings were rated by Napeikar and Kalemunyang respondents respectively as useful because they eased the crisis and had assisted contain similar disasters. The reasons given for this was that food for asset gave people strength to work on their own farms to produce their own food and the tools distributed had remained with beneficiaries even after the departure of organisations. This had ensured continuity of the projects. The respondents pointed out that, the initiation of these projects was useful because it encouraged own food production and promoted community empowerment through project ownership. Nonetheless, all the clusters rejoined that other relief aid they received were also useful because they responded to the needs of that day and addressed temporal needs.

All socio-economic groups in Kalemunyang and Napeikar mentioned TRP, CF's and WVK intervention respectively as having long term positive effect on their lives. They declared that food for asset to construct or to desilt canals and distribution of tools played a major role as far as food security is concerned. The intervention provided by these organisations promoted self-food sufficiency by provision of tools to poor households that could not afford them, promoted community empowerment through capacity building trainings on improved agronomic practices and food for work to construct canals to be able to work on their farms, which made people responsible and not reliant on free external aid. However some respondents quoted the interventions having been imposed to the community without prior community need assessments. This was mentioned to have caused a problem of unsustainability as it has been noticed in the past.

4.7 Riverine Smallholders Interventions Preferences

During the FGDs in the two clusters, respondents stated their preferred interventions as shown in Table 8 below. The study discovered that all well-off respondents preferred microloans to start or expand their small businesses as this was said to boost seasonal activities during rainfall stress. Other socio economic groups had varied preference based on the needs, priorities and the capacities to handle the intervention if granted.

Table 8: Prioritized preferred interventions by gender in two clusters. N = 4 FGDs

Male	Well-off	Middle	Poor
Kalemunyang	<ul style="list-style-type: none"> - Micro loan for small business - Portable generators for vegetable production - Drought and early maturing seeds (maize and sorghum) 	<ul style="list-style-type: none"> - Food for work to construct/repair canal - Fencing farms to protect from livestock damage, wildlife/thieves - Portable generators to help during low river water levels - Construction of dams for watering livestock to restrict from trespassing and damaging farms 	<ul style="list-style-type: none"> - Food for asset for canal expansion/desilting for own production - Fencing of gardens to protect from stray livestock, humans & other predators. - Micro loans for Income generating activities - Restocking of goats - Provision of drought resistant and early maturing variety seeds.
Napeikar	<ul style="list-style-type: none"> - Loan for small businesses to diversify livelihoods - Mechanical farm implement to expand agricultural land for more productivity - Drought resistant seeds, maize and sorghum 	<ul style="list-style-type: none"> - Money for starting small business for alternative means of living - Metallic fence for the farm 	<ul style="list-style-type: none"> - Restocking of goats - Underground water for irrigation
Female	Well-off	Middle	Poor
Kalemunyang	<ul style="list-style-type: none"> - Underground water for irrigation - Fencing the farm to protect from livestock damages - Cash grant during crisis 	<ul style="list-style-type: none"> - More food for extension of canal - portable generators - Fencing of the farms to protect it from livestock and other predators - Micro credit initiative for small businesses 	<ul style="list-style-type: none"> - Provision of drought resistant crops seeds - provision of microloans - Facilitation for vegetable market
Napeikar	<ul style="list-style-type: none"> - Capacity building training on improved agronomic practices & businesses - Money for IGAs - Underground water for irrigation - Concrete canal to control seepage - Portable water to control waterborne diseases - Metallic poles to minimize termites attack (fence) - Posho mills (grinding mill) 	<ul style="list-style-type: none"> - Microloans for small businesses 	<ul style="list-style-type: none"> - Provision of less labour intensive tools (tractor) to plough more land

4.8 Effects and Consequences of Rainfall Variability to Smallholders

The major potential consequences as a result of rainfall variability risks effect declared by respondents during discussions included crop failure, increased farm inputs prices, increased basic food prices, crop destruction, poor pasture productivity, and reduction in water availability and unanticipated sale of livestock / assets and migration among others as detailed in table 9 below.

Table 9: Socio-economic and environmental effect of high rainfall variability

	Effect	Consequences
Social	• Food insecurity	• Malnutrition and famine, conflict on scarce resources within the family and with neighbours (pokots)
	• Rural urban migration	• Mushrooming of shanties and social unrest, unemployment
	• Increased natural resources overexploitation	• Increased threat to human and animal existence
	• Inequitable rainfall disaster relief	• Social unrest, corruption and distrust
	• High demand for water	• Increased conflict among water users
	• Poor or lack of distribution of available resources (water and food)	• Migration of people, resettlement to other areas and conflict among water users
	• Migration	• Family disintegration
	• Recall of school children from school to work for neighbours	• High levels of illiteracy, low human power
Environment	• Reduced water quantity and quality	• More water borne diseases, increased salt concentrations
	• Reduced water levels	• Low accessibility to water
	• Reduced woodlands, crop and range lands productivity	• Food shortage and reduced incomes
	• Soil desiccation due to widened rainfall season	• Increased soil blow activities
	• Soil productivity decreases	• Soil degradation (top soil erosion) and desertification
	• Evapotranspiration increase	• Crops withering and drying
	• Damage to natural habitats	• Loss of biodiversity
	• Decreased water resources	• Lack of drinking and feeding water, trekking long distances for water
Economic	• Food shortage	• Drastic price increase
	• Reduced livestock quality	• Sale of livestock at low market price
	• Reduced business with petty traders	• Increased prices for farming commodities
	• Loss of crops for food and income	• Increased expense of buying foods from shops
	• Forced financial loans	• Increased debts, increased credits from money lenders and financial institutions

5.0 CHAPTER FIVE: DISCUSSION

5.1 Riverine Smallholders Sources of Livelihoods

The results from this study depict that there are principal and complementary sources of living for different socio-economic groups of households in the study area as summarized below.

- i. The poor households, both male and female, engage in riverine farming as the principal activity with a wide engagement in complementary activities including sale of firewood, charcoal, alcohol brewing, mat weaving as key other sources of income as mentioned by Binsbergen (2008) in his study.
- ii. The middle households, both male and female, engage in petty trade and sale of natural resources as their principal activities with diverse complementary activities including livestock rearing, riverine farming, sale of charcoal and mat weaving.
- iii. The well-off households, both male and female, engage in livestock keeping, petty trade on basic food stuff and riverine farming as the main principal activities with diverse complementary activities including mat production for sale and livestock trading.

The principal activities according to the respondents are described as full time activities engaged in by the household as the main source of food and income for the household providing reliable and regular needs throughout the year. Complementary activities were described as irregular or rather part-time activities household pursued to provide some food or income for a certain period of time and these activities cannot successfully sustain the consumption needs of the household alone for a long period of time.

In times of rainfall uncertainties, it was claimed by respondents that there was tendency of lack of principal activities to all households, which made all socio-economic groups to take part in multiple complementary activities for their survival. This meant that in the nonexistence of a principal means of living, households ventured in different livelihood activities to earn a living to subsist. Similar study with Eriksen, Brown and Kelly (2005) has shown that depending on the severity of the rainfall shock, complementary activities engaged by the middle and the well-off households are easily converted to principal livelihood strategies while poor households undertake day today opportunistic activities to survive. Further results from this study indicate that riverine smallholders' livelihoods and related resources are perceived to be severely affected by rainfall uncertainties in different ways because shocks related to rainfall inconsistency has been reported to contribute to stallholders' loss of living including sale of productive assets to ease the effect of shock.

5.2 Rainfall Variability Perception by Riverine Smallholders

There is evidence that rainfall variability was increasing (Meier, Bond and Bond, 2007) and chances of prolonged dry spell have doubled from one year in five years to one in three years. This was confirmed by respondents interviewed during the field work that both Kalemunyang and Napeikar rainfall was highly erratic and unreliable, both in frequency, distribution and amount (**annex 4**), increasing exposure of riverine smallholders to rainfall related disasters in the study areas. This confirms the findings of Romero, Guijarro and Alonso (1998) that rainfall variability in space and time is a central characteristic of arid and semi-arid regions. According to Masvaya, Mupangwa and Twomlow (2008), the high degree of rainfall variability, when combined with relatively low asset base of riverine smallholder's households, restricts household crop

management strategies leaving no option for the majority of the households but only to pursue non-farm risk management strategies. The change in rainfall pattern and the prolonged dry spell in these clusters are expected to have excruciating negative effects on riverine farming and food production culminating to food insecurity among the riverine smallholders affecting the entire economic standing of the study clusters. High rainfall variability in Kalemunyang and Napeikar present a bleak picture for the future (Daze, 2007) because food security and incomes for the riverine smallholders are severely threatened as the rainfall decreases in amount, widen in spacing and shortens in length (Galvin, et al., 2004). On the other hand, the steady population increase in the study area as shown in annex 5 and the population pressure on the available natural resources contribute and exacerbate the severity of rainfall variability risk.

However, the perception that rainfall variability is God's penalty for abandonment of traditions and norms by the majority of respondents is evidence of very low awareness of climate change and lack of proper knowledge on the role of human activities in environmental degradation.

5.3 Coping Strategies

Riverine smallholders refer to coping strategies as a set of actions taken to obtain resources during the time of adversity and disaster (Eriksen, Brown and Kelly, 2005; Bhrami and Phoumphone, 2002; WHO, 1998). There is evidence from the study that coping strategies are undertaken based on people past experience, socio-economic groups, resources and the ability of individual people to combine these strategies in the best way possible to contribute to the household's income.

It was also deliberated that coping strategies for smallholder's households vary both between households and over time according to preferences, objectives, and the capacity to change (WHO, 1998). Coping strategies are not straight forward actions but follow a sequence of mechanism. During time of crisis, riverine smallholders tend to respond to hazards by compensating the loss by engaging in various risk management strategies. According to Holzmann (2003) these are designed to relieve the impact of the shock once it has occurred and these risk management strategies according to the study included engagement in alternative income activities, sale of asset, changes in diet, external support and labour adjustment.

Analysis of coping strategies from the field data in table 4 shows that riverine smallholders have developed various coping mechanism over time to cushion themselves from rainfall related shock. A similar opinion has been cited by Stringer, et al. (2009) that rainfall variability and uncertainty surrounding its annual reliability have prompted dry land riverine smallholders to adjust to dynamic climatic, environmental, and weather conditions throughout their lives. This was the reason stated in which different socio-economic groups engaged in different strategies as an indications of variations in the levels of needs satisfaction even though they use the strategies to escape the crisis.

The study results revealed that male dominated households involved more in coping strategies including sale of asset, borrowing, migration, petty trade and casual work while female dominated households engaged more often in strategies including charcoal sale, brewing of alcohol and handcrafts. According to the study, male respondents rated sale of livestock and charcoal production as effective coping strategies while the female respondents cited relief food/food for asset and charcoal production as the preferred coping strategies.

Changes in coping strategies between individual households of the same or different socio-economic status have been reported to be attributed by constraining or enabling factors. For this reason, households switch between different activities during the course of the crisis as opportunities arose or constraints make particular activities unviable (Pandey 2009). The study revealed that poor households specializing in complementary activities have a potential to withstand the shock better than households that engage in many irregular activities. For example, a poor household member engaged in charcoal production for sale full time is able to have a steady income compared to a member of the same household that would engage in occasional casual work that will give unstable returns (Eriksen, Brown and Kelly, 2005). Poor households in both clusters though engaged in a number of coping strategies, compared to the rest of the socio-economic groups, none of the strategies generated enough income to sustain the household's food and income needs. However, they valued their contribution because they were coping activities poor households could easily pursue.

From the study data, all interviewed households mentioned anticipating rainfall risks and individual households carefully plan to cope with the shock. This argument has been supported by Corbett (1988). The decision by the household to cope with shocks is determined after consideration of resources available. Well-off and middle household in preparation to the shock were reportedly having engaged in strategies that minimize depletion of household asset during crisis while poor household engage in labour intensity chores because of lack of resources. Seasonal migration to urban towns in search for casual work by the young members of the poor households was cited in both individual household interviews and FGDs as a preparedness coping strategy employed to escape the rainfall misfortune before it strikes.

5.3.1 Alternative Incomes / Food

From the study analysis, alternative income activities pursued by the middle and poor socio-economic groups enabled them to meet household food needs. The majority of the households interviewed declared that during the dry spell, there was increased involvement in numerous activities with poor male and female households intensifying their engagement in a wide range of activities including the collection of firewood, wild food, charcoal production, casual work and brewing of local liquor by the help of their wives. Middle male and female socio-economic households engaged in mat weaving and charcoal production while the well-off and female poor pursued sale of livestock. However, the exploitation intensification of natural resources (charcoal production, firewood and palm leaves collection) by the middle and the poor households during periods of prolonged dry spells to supplement household food supply and income undermines the viability of smallholders and sustainable environment management. This is because eleven out of twelve respondents interviewed were unfamiliar with the relationship between human activities, environment and rainfall variability, a potential risk to the environment and livelihoods, though this was mentioned to be an important coping strategy to their survival.

The study result shows that poor and middle households give importance to intensification of income generating activities coping strategies (increased casual work, increased collection and sale of charcoal, firewood and petty trade) because during crisis opportunities for a number of these coping strategies increase significantly. Well-off households and middle socio-economic groups were reported to have engaged in coping strategies that do not draw household source of food or income in the initial stage of the crisis but as the crisis persists; they tend to sell off their livestock and other productive assets.

For this research, varieties of wild food plants were mentioned to be available in the study area both in the wet and dry season. As indigenous plants they were more readily able to withstand excessive low rainfall than most of the crops that were mentioned to grow locally. All socio-economic groups ate them but the extent and variety differed greatly between well-off and poor households. Well-off households ate them to supplement their diet rather than to make up a shortfall in other available food sources and consumed those that were most easily available. Middle households relied on them more as a means of limiting consumption of their own production to keep sufficient stored for the hard period and thereby limit the need to exchange assets for food. Poorer households had to rely heavily on them throughout the year as on-farm production and sustainable exchange opportunities still left a considerable shortfall to be made up through the collection of wild foods. As the poor had least access to regular other forms of income generating activities, this meant the major part of the balance was obtained from wild foods.

5.3.2 Reduction of Assets

Results presented in this thesis show that all socio-economic groups of households interviewed sold their productive assets including radio, motorbikes, bicycle and livestock for survival. This was mentioned to be the last resort for these socio-economic groups when the crisis intensifies and no other form of aid is forthcoming. This was reported being an important strategy to prevent household skipping meals or eating less. However, according to Niimi, et al. (2009), the sale of productive assets affects negatively the future productivity of these households as it will take them many years to acquire the same assets. The study revealed that middle and well-off households, both male and female, ventured into sale of asset while the poor category reported sale of the only livestock as the last resort due to poverty.

5.3.3 External Support / Informal Insurance Mechanisms

From the discussion with different socio-economic groups of households, social safety net including exchange, borrowing and relief aid was mentioned to have played a significant role during rainfall failure in the study area. It was found out from the study that middle and well-off socio-economic groups allow borrowing in the form of grains or livestock (goats) from relatives and neighbours in the hope of reciprocity during periods of shock. The study also showed that Non-governmental organisations, government and the church were the main source of aid in the study clusters. Analysis shows that all interviewed respondents acknowledged the importance of food aid distribution from NGOs during the crisis period though this normally lasted for a very short time. All respondents declared that it saved many lives and preserved property despite its short duration.

During key informants interviews, the government and NGOs working in relief aid in the area pointed out that they have supported the establishment and revitalization of small furrow irrigation schemes in an effort to expand land acreage for increased food production at the same time reduce production deficit due to prolonged dry spell. The aim of this intervention was to increase food security and the wellbeing of the riverine smallholders. The study depicts that food for asset and distribution of agricultural implements was rated useful interventions implemented by the government and NGOs because according to the respondents the intervention had a long term livelihood impact to them since it was meant to empower the beneficiaries in order to produce their own food to reduce being passive recipients of food relief.

According to the respondents, the food for asset intervention did not consider the physically challenged in their targeting, marginalizing them further. It was also acknowledged by the NGOs that they lacked financial resources to reach many beneficiaries coupled with high levels of community illiteracy to be engaged in technical project implementation that has led to limited impact and sustainability. NGOs blamed riverine beneficiaries for their renewed indulgence into poverty by investing into activities sensitive to climate and insecurity after recovery from rainfall failure causing vulnerability fallback.

During the key informants interviews with organisations representatives, it was declared that despite the efforts the government and the NGOs are doing to address the vulnerabilities of riverine smallholders, the institutions encounter a number of challenges (refer to Annex 1). The main mentioned challenges were inadequate resources to reach all the needy cases, prolonged dry spell is becoming cyclic making NGOs difficult to plan properly, insecurity was becoming a challenge in the operation areas with the organisation restricted in its operation and the coverage, poor project design, inadequate field allowance to the ministry of agriculture personnel, political interference – incitement and influence from politicians that why should people work when they can get free food, high levels of illiteracy among the riverine smallholders – training the illiterate adult was very hard. For instance training smallholders to change from seeds broadcasting planting to row planting took quite some time, funding delays from the donor, delayed release of funds for about six (6) months affected the projects results.

5.3.4 Labour Adjustment

The poor households in Kalemunyang mentioned recalling children back from school during rainfall variability related shock. According to the data, children are sent to close relatives in better areas or sent to work in well-off neighbours in exchange for food. The reasons mentioned for this was to reduce the number of consumers in the household and inability to pay school fees for the children. It was claimed that children sent to relatives may attend school but those sent to neighbours are unlikely to resume schooling because they become full time baby sitters or housemaids. Young members of poor households were also reported to migrate to urban centres to look for employment and abandon their farms. According to Brown and Hansen (2008), this is a sacrifice capacity to build a better life in the future.

5.3.5 Increased Austerity / Meals Reductions

According to field data, FGD interview has presented that households reduce or skip meals so as to preserve or make food stocks last for a longer time as the situation is being monitored. Poor households agreed that skipping of meals was a response to complete exhaustion of food stocks in the household due to irregular alternative sources of income and food. When food was available, preference was given to children and the elderly persons in the household. All socio-economic groups cited that households would rather consume less food than to be forced to sell their productive assets in the long run. However, study results revealed that eating less by middle and well-off households or skipping of meals by poor households in quantity and frequency subject household's members to physical weakness which exposes them to more hazards including exposure to opportunistic diseases due to lowered nutritional body status.

CHAPTER SIX:

6.0 CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

The result from this study has shown that there are principal and complementary sources of living for different socio-economic groups of households. Principal activities are full time activities that form the main source of food and income while complementary activities are part time activities pursued to provide food or income for a certain period of time and cannot successfully sustain the consumption needs alone. As a result of rainfall adversities, principal activities lack and all socio-economic groups resort to participate in multiple complementary activities for survival.

The result from this study affirms that rainfall in Kalemunyang and Napeikar is highly erratic and unreliable, both in frequency, distribution and amount. The perception of the riverine smallholders indicated rainfall has decreased in amount, widened in spacing and shortened in length. The decrease in rainfall has been associated with less rainy days. This implies that households are restricted to crop management strategy which has been having excruciating negative effects on riverine farming and food security among the riverine smallholders. This presents a bleak picture for the smallholders' future food security and incomes as this has been severely threatened by rainfall variability and compounded by smallholders' ignorance about the relationship between human activities and rainfall variability.

The coping strategies of the two clusters are similar and were grouped to include alternative income activities, sale of assets, changes in diet, external support and labour adjustment. Poor households have an inclination towards increased participation in collection of natural resources which undermines the viability of smallholders and sustainable environment management.

The study results revealed that male dominated households involved more in coping strategies including sale of asset, borrowing, migration, petty trade and casual work while female dominated households engaged more often in strategies including charcoal sale, brewing of alcohol and handcrafts. Male respondents rated sale of livestock and charcoal production as effective coping strategies while the female respondents cited relief food/food for asset and charcoal production as the preferred coping strategies.

The participation of smallholders in several coping strategies is a sign of uncertainty as to which coping strategies are viable and therefore households kept on gambling between activities. Middle and poor households based on their past experience undertook many activities in the initial stages of the crisis because during this period opportunities for a number of these coping strategies increase significantly. This is supported by the literature that during this period flexibility becomes a coping strategy that allows smallholders to switch between coping activities as the situation demands and this is important because flexibility in decision-making then permits smallholders not only to reduce the chances of low income, but also to capture income-increasing opportunities when they do arise.

It is clear from the many activities pursued by these groups of households that most of the coping strategies contribute insufficient returns to the household such that sustaining or rebuilding the household livelihood assets is not possible. Survival of the fittest would mean extensive utilization of natural resources (woodland) as a source of income which exacerbates the environment

pressure posing a negative impact to the environment worsening rainfall variability setting poor households into a vicious cycle of poverty. The excessive exploitation of the natural resources in the bid to preserve or save lives during times of rainfall adversity has a long term negative effect on the environment and people's livelihoods.

Consumption of wild foods is considered a self-choice for all socio-economic groups though the extent and variety differed greatly between well-off and poor households. Well-off households eat them to supplement their diet rather make up a shortfall in other available food sources and consume those that are most easily available. Middle households rely on them more as a means of limiting consumption of their own production to keep sufficient stored for the hardship period and thereby limit the need to exchange assets for food. Poorer households rely heavily on them throughout the year as on-farm production and sustainable exchange opportunities still left a considerable shortfall to be made up through the collection of wild foods. As the poor have least access to regular other forms of income generating activities, the major part of the balance is obtained from wild foods.

Poor, middle and well-off households could only sell their productive assets as the last resort and this is to avoid eating fewer meals or skipping meals. It is worrying when households depose their productive assets because this will affect their future productivity as it will take them many years to reacquire the same assets.

Recalling children back from school to work in neighbours or stay with relative was one of the weak coping strategies poor households in Kalemunyang pursued. Children under these conditions do not continue with education resulting in missed opportunity which is a sacrifice capacity to build a better life in future.

The study has been able to establish that households skip or reduce meals to make food stocks last for a long time. Poor households skip meals because of complete exhaustion of food stocks. During this period of chancing food, children and the elderly members of the household are given first priority. This strategy is not effectiveness as productive members of the household become physically weak exposing them to health hazards.

Social safety net among the residents of Kalemunyang and Napeikar played a great role during rainfall adversity including borrowing of grains and livestock (goats) as this was to be reciprocated in future. Other external support included the government, church and the NGOs in the form of relief or development projects. Relief intervention was meant to save lives and preserve productive assets from depletion. Food for asset projects established by the government and NGOs was useful in facilitating own food production to bridge the food production gap during prolonged dry spell. The food for asset project though self-targeting left out the physically challenged and the elderly. Lack of financial resources to reach many beneficiaries is a major setback coupled with low level of community literacy to engage in technical project implementation that led to limited impact and sustainability. Fall back of targeted household into poverty as a result of reinvesting in activities sensitive to rainfall variability and insecurity is still a major challenge.

It was observed that the interventions provided by relief agencies including the government addressed partially the needs of the smallholders. This is evident in the number of food insecurity smallholders have encountered. This is because interventions are not people's needs driven but rather institution's interest driven.

6.2. Recommendations

The following operational and policy recommendations are put forward based on the result of the study:

There ought to be practical holistic community empowerment in decision making process by intervening institutions including community needs identification and prioritisation, project implementation and monitoring and evaluation to ensure projects sustainability. Otherwise the fallback of smallholders to vicious cycles of vulnerability would be everyday trend of events.

The food for asset interventions carried out by government and NGOs to increase the household food security by self-production is inspiring but challenges surrounding targeting, accountability, transparency and good governance require in-depth redesign and approach. Hence separate interventions such social safety nets in form of unconditional cash transfer for physical challenged and elderly should be adopted.

Support in form of IGAs ought to be given a thought in riverine communities to enable them diversify their livelihoods activities outside the agricultural domain since the majority of the coping strategies among the riverine smallholders are dependent on natural resources that increase environmental degradation.

Community participation in disaster response assessment should be encouraged in order to understand their coping strategies and perception and strengthen coping strategies that do not affect negatively other communities and future generations.

There should be promotion of early maturing local crop diversification, mainly sorghum and maize, with drought and pest/disease resistant varieties promoted among riverine smallholders to maximize the river flow from the few rain showers received occasionally. The implementation of this should go hand in hand with the fencing of farms / gardens to protect them from livestock damage and other predators.

There is lack of institutional, economic and political commitment from the government, NGOs and the local political leadership in addressing riverine food insecurity as demonstrated by low literacy levels and uninformed causes of changes in rainfall pattern including zero use of meteorological forecast information. This is evidenced by the perception of riverine smallholders that rainfall variability is a penalty from God; this requires an ambitious environmental awareness raising programme to inform communities about the relationship between destructive human activities, environmental depletion, rainfall variability and potential livelihood risks. This initiative should be used to strengthen community initiatives to manage natural resources (maintain woodlands) and diversify livelihood options.

Noting the differential preference to coping strategies engaged in and interventions preferences denoted by different socio-economic groups of female and male respondents during rainfall adversities, the government and the NGOs should abandon the concept 'a whole is better than the sum of its part' in responding to heterogeneous needs of the society. It is therefore important to design different support for different socio-economic groups of male and female headed household during risk management planning. This is meant to respond to specific needs for each specific social group and gender. At the same time, the government and NGOs should address

the core underlying causes of riverine smallholders' vulnerability including literacy levels and infrastructure.

Riverine smallholders' food insecurity is a major challenge to the government and the NGOs working in the area, food insecurity therefore need to be tackled head-on by promotion of asset and income building programmes. There ought to be a separate government policy strategy addressing food security in riverine setup.

The findings of this research need to be incorporated in rainfall variability effects and consequences vulnerability assessment to guide the existing disaster preparedness and risk management coordination team.

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APPENDICES

Annex 1: Objectives, Activities and Challenges of Support Institutions

Institution	objective	Activities	Challenges
Child Fund	<ul style="list-style-type: none"> To address food insecurity caused by rainfall variability, cattle rustling, diseases through diversifying livelihoods and taking children to school to support them later in life 	<ul style="list-style-type: none"> Excavation of canals & bush clearing to increase land acreage Establishment of nursery bed. Distribution of farm implement Distribution of seeds + tree seedlings of exotic tress including neem, fruit trees, mangoes, citrus fruits, guavas Support establishment of shallow wells, provision of gen set generators to support vegetable gardens Support groups to harvest water using new technology Training on improved agronomic practices Repair of water intake, building of new intake, excavation of canal and profiling Support improving local goat breeding with Galla goats Introduction of improved crops Introduction of grass for small ruminants (zero grazing) establish pasture farms Cooperative partner with GoK-ALRMP and WFP in food distribution during emergencies – drought / flood 	<ul style="list-style-type: none"> inadequate resources to reach many beneficiaries in need Prolonged dry spell is becoming cyclic giving less time for people to recover. Insecurity is a huge challenge in the operation areas with the organisation restricted in its operation and the coverage.
Arid land resource management Project	<ul style="list-style-type: none"> To increase food security through food for asset with a future long tern forecast for own food production Increase pasture and browse for livestock Diversification of livelihoods Increase water availability through 	<ul style="list-style-type: none"> Providing expert advice to the implementing FFA partners i.e. linking the ministry of agriculture with the target communities Coordinating joint monitoring and evaluation FFA team activities in the county Promoting coordination with ministerial focal points within the county Promoting disaster mitigation and preparedness activities at the local level through MET Implementing community awareness activities through Providing training, guidelines 	<ul style="list-style-type: none"> Water harvesting activities including construction of dams get wasted because of lack of rain/no rainfall There is insecurity in most border areas Improper assessment to identify the right tools to be distributed to the target beneficiaries. Poor project design Inadequate field allowance to the ministry of agriculture personnel Political interference – incitement from politicians

	<ul style="list-style-type: none"> construction of water pans • Decrease environmental degradation by planting of trees in depilated areas • Soil and water conservation through terracing • Promotion of markets by construction of feeder roads to link schools and markets 	<ul style="list-style-type: none"> and plans to make disaster risk management more effective • Establishing disaster management implementation teams at the county, district and divisional level. 	<p>why people have to work to get free</p>
World vision Kenya	<ul style="list-style-type: none"> • To boost food security by expansion of the scheme from 100 smallholders to 300 smallholders 	<ul style="list-style-type: none"> • The main activity was revitalization of irrigation scheme, expansion of the scheme and modernization, survey with infrastructure put in place • Fencing of the farm • Construction of water intake and gate valves, division boxes etc. • Community capacity building on improved agronomic practices • Introduction of Jetropha for edge fencing as well as income generating activity as a biofuel by sale of seeds and residuals used as animal feeds • Restocking of goats with introduction of Galla milk goat to improve the local breeds to enhance food security (milk consumption) • Training on animal husbandry and vaccination with starter kits distributed to the trainees • Improved seeds and fruit seedlings distributed to the community 	<ul style="list-style-type: none"> • Illiteracy – training the illiterate people was very hard – training to change from broadcasting seeds to row planting took quite some time • Limited resources/funding – targeting very small number of beneficiaries • Political conflict and interference • Funding delays from the donor, money release 6 months after the start of the project

Annex 2. Seasonal Calendar of Activities, Kalemunyang Cluster.

Activities	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Ploughing / cultivation	xxx											
First weeding		xxx										
Watching crops from predators (birds)			xxx									
Maize and sorghum harvesting				xxx								
Sorghum ratoons rejuvenation					xxx							
Harvesting of ratoons						xxx						
Farms open to livestock to graze							xxx	xxx				
Uprooting stalks from previous crops									xxx			
Canal desilting and valve gate repairs										xxx	xxx	xxx

Annex 3. Seasonal Calendar of Activities, Napeikar Cluster.

Activities	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
First ploughing / cultivation	xxx											
First weeding		xxx										
Watching crops from predators (birds)			xxx									
First maize harvesting				xxx								
Clearing stalks from previous crops					xxx							
Second ploughing and planting						xxx						
Channeling water to farms							xxx					
Second maize harvesting								xxx				
Canal desilting and valve gate repair									xxx	xxx	xxx	xxx

Annex 4: Turkana Annual Rainfall Data 2001 – 2010

	Duration in Years / Rainfall Amount (mm)									
Month	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jan	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.10	5.00	62.90
Feb	0.00	0.00	0.00	0.00	0.00	4.00	28.00	0.00	0.00	3.70
Mar	0.00	0.00	0.00	0.00	17.00	24.00	3.00	39.20	0.00	80.00
Apr	0.00	0.00	0.00	57.20	1.80	35.90	28.00	98.00	1.00	5.50
May	0.00	0.00	0.00	13.00	57.00	1.00	56.30	0.00	30.00	0.80
Jun	0.00	0.00	0.00	0.00	5.00	0.00	5.20	0.00	0.00	0.00
Jul	0.00	0.00	0.00	0.00	32.00	51.00	49.00	0.00	0.00	2.00
Aug	0.00	0.00	0.00	0.00	0.00	153.20	52.00	0.00	0.00	38.00
Sep	0.00	0.00	0.00	26.00	29.00	0.00	16.70	5.00	0.00	1.00
Oct	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.10	1.00	0.00
Nov	0.00	0.00	0.00	113.00	0.00	0.00	3.20	31.00	2.00	0.00
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	80.30	0.00
Total	0.00	0.00	0.00	209.20	141.80	270.10	241.90	213.40	119.30	193.90

Source: <http://www.weatheronline.co.uk/weather/maps/city?FMM=1&FY=2005&LMM>

Annex 5: Turkana County Population Year 1999 and Year 2009

District	Division	Year 1999	Year 2009
Turkana Central	Central	35,919	50307
	Kerio	15,409	21581
	Kalokol	28,735	40245
Loima	Loima	33,979	74,053
	Turkwel	49,881	69862
Turkana North	Kaaling	24,053	49,641
	Lapur	12,780	28,694
	Kibish	6,056	15,570
	Lokitaung	22,586	62,660
Turkana west	Kakuma	97,114	136,232
	Lokichogio	36,187	67,401
	Oropol	18,020	56,480
Turkana south	Lokichar	21,791	37,705
	Katilu	12,548	24,058
	Kainuk	11,799	37,387
Turkana east	Lokori	17,915	47590
	Lomelo	6,088	35,763
Total		450,860	855,399

Source: Kenya Population Census, GoK-ALRMP (2010)

Annex 6: Household Questionnaire

Household Questionnaire

Qnr No. _____

Cluster Name: -----

HH status: -----

A. Source of people's livelihoods / strategies

1. Main household source of living (livelihood)
 - Riverine farming only for how long in a year
 - Riverine & livestock
 - Livestock rearing only
 - Other (specify)
2. What income activities do you engage in a normal year?

B. Rainfall trends and perception

3. Have you noticed any changes in the rainfall patterns in the last 10 years?
4. If yes, what changes?
 - Rainfall amounts – if increased, decreased, same or fluctuated
 - Rainfall spacing – if widened, narrowed or same
 - Rainfall time/season – if shortened, extended or same
5. What do you attributes the changes in rainfall pattern to? (Possible reasons/perception for the changes)

C. Coping strategies

6. What activities (coping strategies) do you engage in a bad (poor / no rains rain) year to survive the shock? And why?
7. From your experience in the Question above, which coping strategies were effective in reducing rainfall variability vulnerability? And why?
8. And which ones were not effective and why?
9. Have you received any external aid / interventions during rainfall crisis time and from whom?
10. Which of the interventions you have mentioned above were helpful to you to ease the crisis?
11. And which ones were not? Why?
12. Which ones have had long term positive impact to you and why?

13. In your own opinion, what kind of intervention would you have preferred? And why?
14. What are the socio-economic and environmental effects of rainfall uncertainty on smallholders and their households?
15. What actions in your own opinion do you think the government is doing to affect your coping strategies (positive and negative?)
16. What are your own limiting opinion/constraints to successful coping?
17. Did you have to change your coping strategies at some stage of the crisis? And why?
18. Considering the trends of rainfall variability, what is your own opinion regarding riverine farming?
19. What preparedness coping strategies measures are in place to cope with the crisis before, during and after shock (smallholders)?

Annex 7: Focus Group Discussion

Focus Group Discussion Checklist

1. What is the perception of wealth in the community, who is said to be rich, middle and poor?
2. How has been the rainfall pattern in this area in the last 10 years?
3. What income activities do majority of the rich, middle and poor engage here; rank them in order of importance?
4. What activities do the poor, middle and rich engage to cope with rainfall variability shock?
5. What advantages, disadvantages, strong or weak points to coping strategies for each coping mentioned above for each category?
6. Which category of the population are severely affected by this climate variability and why?
7. What external assistance do you receive during the time of crisis (crop failure due to lack of rain) and from whom?
8. In your own opinion, was the assistance effective and addressed your needs? If no, why?
9. In your own opinion, what kind of intervention would you have preferred, rank them and why?
10. What actions in your own opinion do you think the government is affecting your coping strategies (positive and negative)?

Annex 8: Key Informants Interviews

Key Informants Interviews

Position of respondent: ----- Organisation: -----

1. How long has the organisation worked in the area?
2. What activities / interventions does your organisation undertake in the area?
3. What constraints/weaknesses do you face in your interventions?
4. What are the intentions of the interventions to the way of living of the target groups?
5. What do you think are the main contributing factors to the vulnerability of this group of people?
6. Does your organisation factor the element of rainfall variability in its programmes if yes how and if no why?
7. In your own perspective, which coping strategies are often used by the riverine smallholders to buffer from rainfall variability?
8. Are your interventions linked to existing traditional coping strategies?
9. Considering the current rainfall pattern in the area, do you think the risk management strategies pursued by this group of people can permit them remain viable?
10. How do you see future assistance?

Thank You for Your Time!!

