UNDEVELOPED ADAPTATION

CLIMATE RISKS, VULNERABILITY AND HOUSEHOLD WELL-BEING IN MWINGI/KENYA

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Dedication

To my son Kiragu Kimani.

For making do with telephone parenting.

Acknowledgements

In my childhood days, my dreams and interest in pursuing doctoral studies were silently nurtured as I listened to stories of, and admired the persona of Prof. Wangari Maathai. She was the most educated woman in my home district, Nyeri-Kenya by then, a renowned environmentalist who would later be awarded the Nobel Peace Prize in 2004. It was no wonder that when I joined Kenyatta University in 1994, I chose environmental studies as my degree course and continued with the same focus at master's level in Moi University, Eldoret. My first major engagement, at the International Union for Conservation of Nature (IUCN) was enriching. It is here that the debates on climate change came close to my mind. I had to support programmes of adaptation to climate change in the water sector in Tanzania. I felt inadequate beyond the managerial roles and thought that a PhD topic on climate change and adaptation would equip me with better skills to be able to make worthwhile contributions to climate change programmes. So, in 2008, through the support of Moi University, I gave up a promotion at IUCN to start my studies in Germany. Moi University had entered into a partnership with University of Bayreuth to support a Graduate School of African Studies. One of the research areas of focus was risk and environmental criticalities in Africa – a fitting umbrella where I could pursue my interest on climate change.

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During the cold winter evenings of the early years into my studies, we formed an amorphous group and called it research area E, simulating an extension of BIGSAS Research Areas A, B, C and D. We would frequently meet at Café Ponte for coffee or at Royal for Döner Kebab. A big wave to my comrades in R.A. E*ating*^{Tm}.

In the course of my studies, I met and made wonderful German student friends. Jennifer Scheffler was a good buddy and a fantastic organizer. With her, I visited and tried on new things – bowling, skiing, ice-skating, planting flowers and zuchinis on BIGSAS window seals. She encouraged me to contribute to the BIGSAS student newsletter, by running a tiny

column titled *my Green BIGSAS*. I hope I contributed to resource use efficiency in the BIGSAS student office wing. I will truly miss you Jenny. Other friends included Johanna Rieß, Lena Kroeker, Valerie Hänsch, Antje Daniel and Clemens Romankiewicz. Alžběta Dunajová from Czech Republic, I remember you in the many lunch times we shared at the GSP *Mensa*.

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Above all, I give thanks to almighty God for the gift of life and health. I end by reflecting on Ecclesiastes 9:11 – "The race is not to the swift, nor the battle to the strong ..... but time and chance happens to them all".

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Acronyms

AA	Action Aid
ACF	Action Contre la Faim
ACZ	Agro-Climatic Zones
ADRA	Adventist Development and Relief Agency
AFRICOG	African Centre for Open Governance
ALIN	Arid Lands Information Network-Eastern Africa
ALLPRO	**A**SAL-based **L**ivestock and Rural **L**ivelihoods Support **Pro**ject
ALRMP	Arid Lands Resource Management Project
ASAL	Arid and semi-arid lands
CBO	Community-Based Organisation
CDF	Community Development Fund
CIP	Commercial Insects Programme
COP	Conference of Parties
DASS	Decentralized Agricultural Support Structures
DC	District Commissioner
DED	Deutsche Entwicklungsdienst
DRR	Disaster Risk Reduction
DWO	District Water Officer
EDRP	Emergency Drought Recovery Project
FAO	Food and Agriculture Organization of the United Nations
FFA	Food for Assets
FFS	Farmer Field School
FFW	Food for Work
GAA	German Agro-Action
GHG	Greenhouse Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoK	Government of Kenya
GTZ	Gesellschaft für Technische Zusammenarbeit
HIV/AIDS	Human Immuno-deficiency Virus / Acquired Immune Deficiency Syndrome
ICIPE	International Centre of Insect Physiology and Ecology
IFAD	International Fund for Agriculture and Development
IPCC	International Panel on Climate Change
JAICAF	Japanese Association for International Collaboration of Agriculture and Forestry
KACCAL	Kenya Adaptation to Climate in Arid and Semi-arid Lands
KANU	Kenya African National Union
KCCWG	Kenya Climate Change Working Group
KFS	Kenya Forest Service
KMC	Kenya Meat Commission
KWFT	Kenya Women Finance Trust
KWS	Kenya Wildlife Services
MCSS	Ministry of Culture and Social Services
MDG	Millennium Development Goals
MoA	Ministry of Agriculture
NALEP	National Agriculture and Livestock Extension Programme
NCPB	National Cereals and Produce Board
NGO	Non-Governmental Organisation

OECD	Organization for Economic Co-operation and Development
PRA	Participatory Rural Appraisal
PTA	Parents-Teachers Association
RISE	Regional Institute for Social Enterprise
SIDA	Swedish International Development Aid
SLA	Sustainable Livelihoods Approach
SWCP	Soil and Water Conservation Programme
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund

Abstract

Rural livelihoods in Kenya's arid areas are mainly based on rain-fed cultivation and herding of livestock. Climate risks either through variability or change pose significant threats to these livelihoods. Yet, rural households have to simultaneously deal with multiple risks. Global discourses on adaptation to climate change therefore need to take cognizance of context within which households experience and manage risks. This study set out to understand household adaptation practices in the face of climate risks with the aim of offering an alternative conceptualisation of adaptation that is not limited to climate risks and is applicable at the level of rural farming households. The study examined the perception of and the role that climate plays in the lives of the people of Mwingi, Kenya; the adaptation practices they engage in to support their well-being; the factors determining choice and constraints to undertaking these adaptation practices and the reproduction of these constraints. The study relied on theories of capacity and choice, and drew from tenets derived from Amartya Sen's capability approach, Anthony Giddens' structuration theory as well as new institutionalism. Data was collected using qualitative methods comprising of focus group discussions, key informants and expert interviews, observation and a household survey. The study findings reveal that precipitation is the main climate element featuring in local people's description of changes in weather. Specifically, droughts spell the main climate risks that local people experience and live with. Households perceive climate through the impacts of weather on crop harvest or on pasture availability. Drought impacts result into three forms of crises - domestic water crisis, food crisis and livestock wealth loss crisis. These crises affect households' capability to access water, secure income as well as secure social status in society. Socio-economic and cultural context are observed to influence household choices and effectiveness of adaptation strategies. Actors in administration of development and humanitarian interventions use their authoritative and allocative resources to determine which and how infrastructure goods and services vital to households' adaptation practices are supplied. Market failure is observed to be a significant factor in defining the conditions under which households chose and undertake adaptation practices. Kinship and gender relations as well as societal social status also influence choice of adaptation. Households practise communal pooling of resources based on kinship relations. Gender orientations influence norms of property ownership, mobility and decision-making. In seeking to understand how constraints to household adaptation practices are reproduced, the study observes self-help groups as sites and tools through which unequal power relations are enacted, thereby nurturing a status quo that make constraints to household adaptation practices remain largely unaddressed and unchallenged. Based on the study results, it is prudent that debates of adaptation to climate change at household-level are not limited to assessments of the characteristics of climate risks but go further to embrace the holistic nature of household well-being.

Kurzdarstellung

Ländliche Existenzgrundlagen in Kenias Trockengebieten sind hauptsächlich regenabhängiger Ackerbau und Viehzucht. Klimarisiken, in Form von Klimaschwankungen oder Klimawandel, sind eine erhebliche Bedrohung für diese Existenzgrundlagen. Doch ländliche Haushalte müssen sich gleichzeitig mit mehreren Risiken auseinander setzen. Globale Diskurse über die Anpassung an den Klimawandel müssen daher das Umfeld in Betracht ziehen, in dem Haushalte Risiken erleben und managen. Diese Studie untersucht Haushaltsanpassungspraktiken in Bezug auf Klimarisiken und zielt darauf ab, eine alternative Konzeptualisierung von Anpassung anzubieten, die sich nicht auf Klimarisiken beschränkt und auf die Ebene der bäuerlichen Haushalte anwendbar ist. Des Weiteren erforscht die Studie die Wahrnehmung von Klima und die Rolle, die es Leben der Bevölkerung von Mwingi, Kenia spielt. Insbesondere werden Praktiken der Anpassung untersucht, welche die Menschen zur Unterstützung ihres Wohlergehens anwenden; ebenso werden die Faktoren beleuchtet, die in Bezug auf Anpassungspraktiken Handlungsmöglichkeiten schaffen oder einschränken, sowie das Fortbestehen dieser Einschränkungen. Die Studie stützt sich auf Theorien über Fähigkeiten und Wahlmöglichkeiten und zieht dabei Lehren aus Amartya Sen's „Capability Approach" (Fähigkeitenansatz), Anthony Giddens' Strukturationstheorie sowie auf Theorien des neuen Institutionalismus. Daten wurden unter Verwendung qualitativer Methoden gesammelt. Diese umfassen Fokusgruppendiskussionen, Interviews mit Schlüsselinformanten und Experten, Beobachtungen und einer Haushaltsbefragung.

Die Ergebnisse der Studie zeigen, dass Niederschlag das hauptsächliche Klimaelement ist, das die Menschen in den Untersuchungsgebieten bei der Beschreibung von Wetteränderungen verwenden. Insbesondere Dürren stellen das wesentliche Klimarisiko dar, das sie erleben und mit dem sie leben. Haushalte nehmen Klima durch die Auswirkungen des Wetters auf die Ernte oder die Verfügbarkeit von Weideland wahr. Dürren haben Auswirkungen auf drei Formen von Krisen – Haushaltswasserkrise, Nahrungsmittelkrise und den Verlust von Viehbestand. Diese Krisen beeinträchtigen die Fähigkeiten von Haushalten im Hinblick auf den Zugang zu Wasser, Sicherung des Einkommens und Sicherung des sozialen Status in der Gesellschaft. Der sozio-ökonomische und kulturelle Kontext beeinflusst, wie in der Studie gezeigt wird, Haushaltsentscheidungen und die Effektivität von Anpassungsstrategien. Akteure, die auf administrativer Ebene für Entwicklung und humanitäre Interventionen zuständig sind, nutzen ihre Autorität und die ihnen zur Verfügung stehenden Mittel, um zu bestimmen, welche infrastrukturellen Güter und Dienstleistungen, die für Anpassungspraktiken von Haushalten entscheidend sind, bereitgestellt werden und in welcher Weise dies geschieht.

Marktversagen ist ein signifikanter Faktor, wenn es um die Bedingungen geht, unter denen Haushalte Anpassungspraktiken wählen und durchführen. Zudem beeinflussen Verwandtschafts- und Geschlechterbeziehungen sowie der jeweilige gesellschaftliche Status die Wahl von Anpassungspraktiken. Auf der Grundlage von Verwandtschaftsbeziehungen bündeln Haushalte Ressourcen auf kommunaler Ebene. Unterschiedliche genderbedingte Einstellungen haben eine starke Auswirkung auf Normen in Bezug auf Eigentum, Mobilität und Entscheidungsfindungen. Wie ist es zu verstehen, dass Einschränkungen von Haushaltsanpassungspraktiken fortbestehen? Auf der Suche nach einer Antwort werden

Selbsthilfegruppen als Orte und Werkzeuge identifiziert, in und mit denen ungleiche Machtverhältnisse in Kraft gesetzt werden. Dies wiederum hält den Status quo aufrecht, was die Einschränkungen von Haushaltsanpassungspraktiken weitgehend unberücksichtigt und unangefochten lässt. Aufgrund der Ergebnisse der Studie empfiehlt es sich, dass Debatten über Anpassungen an den Klimawandel auf Haushaltsebene sich nicht darauf beschränken sollten, Klimarisiken zu charakterisieren, sondern die ganzheitliche Natur des Wohlergehens von Haushalten mit einschließen sollten.

Summary

This thesis is concerned with understanding household adaptation practices in the face of climate risks in Mwingi, Kenya. The aim is to provide an alternative conceptualisation of adaptation that is not limited to climate risks and is applicable at the level of households. It is motivated by the dearth of critical social science scholarship of adaptation in climate change studies. Most research on adaptation is based on the claim that adaptation reduces vulnerability to impacts of climate change. This claim limits the scope of adaptation to impacts only directly linked to the climate stimuli, thereby underplaying the societal processes that generate contextual vulnerability. In addition, most empirical studies on household adaptation choices and constraints are mainly inward-searching by focusing on household characteristics such as age, education, gender, size of land and income. These are then analysed through complex quantitative analysis models against a list of selected adaptation options. However, there are short-comings of this approach: On the one hand, the inward search tends to overshadow factors of social structures such as institutions and power relations, thus limiting the range of conditions under which households make adaptation choices. On the other hand, the quantitative methods adopted in these studies create little room for narratives that bring out the ways in which the structural factors manifest themselves in the everyday lives of rural people. Consequently, neutral recommendations such as provision of credit, provision of climate forecast information, information on adaptation technologies and more awareness are advanced, while steering away from the sensitive political realms of governance, equity and justice in resource allocation and decision-making.

The study thus takes on the knowledge gap – limited focus on social processes that are involved in household adaptation practices – to address the overarching question: How can adaptation by households in the face of climate risks be understood? Addressing this question is based on the conceptual assumption that an understanding of household adaptation has to be grounded on how local people perceive and define their climate life-worlds and how contextual vulnerability factors contribute to choices and constraints of implementing adaptation practices by households. Based on this background, the study was guided by the following objectives: to understand households' perceptions of climate and impacts of climate risks on their well-being; to explore the conditions under which households choose and undertake adaptation practices; and, to examine how constraints to household adaptation practices are reproduced. The research findings from the empirical study in Mwingi, Kenya, contribute to broadening perspectives on the emerging theory of adaptation to climate change. As a back-

ground to the study question, theoretical as well as contextual foundations of adaptation were explored. Adaptation and vulnerability, the key concepts of the study, were discussed with the aim of arriving at viable operational definitions. Adaptation by households was defined as actions and processes that enhance the ability of households to uphold their well-being in the face of climate risks. Vulnerability on the other hand was conceptualised as context-dependent and operationalised as factors that influence the capacity of households to anticipate and manage impacts of external stressors. These factors were observed to be embedded in the socio-economic, cultural, institutional and political settings within which households experience external stressors.

Empirical studies on adaptation were reviewed in order to tease out their conceptual grounding and identify the knowledge gaps. Focus was also made on theories of capacity and choice, picking on tenets from Amartya Sen's capability approach, Anthony Giddens' structuration theory as well as insights from new institutionalism. The aim was to outline a conceptual framework and corresponding research questions. In addition, the interaction of the biophysical and social settings of drylands was reviewed to provide the larger context within which households make choices and implement adaptation practices.

Qualitative methods provided the main data collection tools, comprising key informants, expert interviews, focus group discussions as well as observation. A survey was also included to embellish the qualitatively collected data. Data were collected on: how the people of Mwingi perceive climate, changes and the variability thereof; importance of climate to people's livelihoods; strategies and resources that the people use in order to overcome challenges occasioned by climate risks; the constraints they encounter in the endeavour to uphold their well-being in the face of climate risks; how they make use of self-help groups in their efforts to manage livelihood in the context of climatic challenges; how external actors – governmental, non-governmental and private sector organisations – make use of self-help groups to support the people of Mwingi. Data material was read severally in order to start identifying recurring themes. This process helped to develop the nature of interpretations that the data could support. Themes from these categories of recurring instances were then developed.

The findings of this study are discussed in three empirical chapters – chapter 5, 6 and 7. On households' perceptions of climate and of impacts of climate risks on their well-being, it was observed that there was no distinct or significant difference in the way the two were perceived. Indeed, as stand-alone terms, they were found to only exist in the English language

while in Kiswahili or the local tongue, Kikamba, one term described both the long-term as well as the short-term weather conditions. The difference was only discernible in the temporal description – the "weather of this place" to mean the long-term average, and the "weather of last year" to denote shorter-term weather conditions. From these observations, it was concluded that climate variability is not a new phenomenon in Mwingi, considering that it is a dryland region and that people are well aware of this variability over time and space.

An enquiry on whether the local people already perceived climate change received mixed reactions on descriptions of change. The concept of change in their perspectives did not therefore conform to the science of climate change in temporal standards. Their perception of change referred to a comparatively short period of time and was linked to hardships experienced during recent extreme weather conditions. Precipitation was the main climate element featuring in local people's description of changes in weather. Drought and rainfall were the representation of absence and presence of precipitation. Droughts hence spelled the main climate risks that local people experienced and lived with. There was no significant difference between the ways in which the local people of Mwingi perceived climate variability and climate change. Instead, drought was the most perceived risk, irrespective of whether it was from "change" or "variability" of the climate. This finding confirmed the hypothesis that households perceive climate through the role of weather in their livelihoods, that climate change or climate variability are only categorisations whose differences get blurred in the lived worlds of the local people. This is based on the observation that approaching the field through discourses of "change" and "variability" appeared subjective and did not elicit objective or coherent responses. Furthermore, perceptions of change are closely linked to memory. Yet, memory is a poor reflector and tool for discerning and distinguishing climate change and variability as it is influenced by a myriad of non-climate factors such as time, age, extension support and macro market factors of liberalisation.

On the exploration of impacts of climate risks, and specifically impacts of drought, to the well-being of the people of Mwingi, it was established that drought impacts resulted into three forms of crises – domestic water crisis, food crisis and livestock wealth loss crisis. Based on Amartya Sen's capability approach, these resultant crises affected critical household functionings, namely: being able to produce food, being able to conveniently access water, being income secure and being able to secure social status in society – like owning livestock and marrying. For adaptation debates to be meaningful and relevant to households, it was concluded that they must be able to link closely with these functionings. This means that they cannot

reasonably afford to seclude themselves to focusing only on the direct characteristics of climate risks and impacts.

Household adaptation practices based on broad categories of mobility, storage, diversification, markets and communal pooling were analysed. The usefulness of employing an inclusive methodological approach exemplified by these categories of adaptation practices was confirmed. The observed adaptation strategies were noted to go beyond the realm of climate studies to spill over into development arena, meaning that debates of adaptation should not be "silo-rised" as a preserve of climate experts if adaptation practices are to be of value to local households' well-being. The claim that the goal of adaptations need to be seen in the context of upholding households' well-being was therefore also confirmed.

The conditions under which households chose and operationalised a mix of adaptation practices to uphold well-being were explored in chapter six. Three broad categories of factors were found to influence the choice and realisation of the optimal potential of household adaptation practices. These were socio-economic, historical as well as the cultural settings.

Under socio-economic settings, actors in administration of development and humanitarian interventions were observed to use their authoritative and allocative resources in a manner that determined which and how infrastructure goods and services vital to households' adaptation practices are supplied. The hypothesis that market failure had a hand in defining the conditions under which households chose and undertook adaptation practices was well captured by the undersupply of infrastructure goods. Lack of guaranteed, organised and regulated markets for principle households' produce was observed to bring about uncertainty thereby jeopardising market exchange as an adaptation practice. Households thus had to choose between two undesirable market options – whether to take their produce to the National Cereals and Produce Board (NCPB) or to brokers. Either case left them as the losers. Similarly, the effectiveness of local enterprises turned out to be influenced by the general wealth conditions of the localities in which they are undertaken. With high poverty levels, the effectiveness of these enterprises was considered to be low.

The necessity of financial capital to support adaptation practices was noted. Availability of credit finances through micro-finance institutions appeared to overtly provide solutions to this need. Further probing established that many households hesitated to reach out for credit facilities to enhance their ambitions, e.g. in diversifying their income-generating activities or in expanding their strategies of storage. High interest rates, daunting eligibility conditions, cul-

tural inhibitions and low purchasing power linked to general poverty conditions explained the paradox of availability of credit despite households' grievances of having no money to undertake adaptation practices. It was therefore concluded that availability of credit was only a first step, and the challenge laid in the details of its accessibility.

Humanitarian aid through distribution of food aid was a key feature in the study region. When food aid was distributed without conditionalities, it was observed to have only a weak relationship with household adaptation strategies. A remote link was also made between supply of food aid and vested private interests by actors involved in its supply. It was therefore concluded that the question of food aid should not be so much about whether it was good or bad in relation to enhancing household adaptation, but about the extent to which it camouflaged private interests. This conclusion allowed for the confirmation of the hypothesis that food aid neither hindered nor facilitated household adaptation practices. However, this does not mean that food aid is irrelevant in debates of adaptation practices. Instead, it helps to qualify food aid as an indicator of a failure of household adaptation practices to uphold households' well-being.

The study examined the path-dependence nature of household adaptation practices. Kenya's historical colonial and post-colonial policies and practices were linked to the popularity of bench terraces and tree planting (storage) as well as self-help groups (communal pooling) among households. This influence was understood in the light of historical institutionalism. Over the years, institutions of soil conservation and community development through self-help continue to influence households' behaviour in choosing adaptation practices. The historical context from which these institutions emerge, provide the frame of preference formation for adaptation practices. Communal pooling through self-help, or storage practices through bench terraces and tree planting, were therefore concluded to be choices that were historically moulded and not an emergent characteristic of perceived changes in climate.

The cultural milieu of choosing and undertaking adaptation practices was understood through tenets of sociological institutionalism. The informal norms of communal pooling as well as norms of property ownership, mobility and decision-making provided a framework for adaptation action. Women chose to keep small stocks of livestock such as goats and chicken as that is the choice available within the norms of livestock ownership. Hesitance by households to sell livestock at onset of droughts was linked to their cultural value as *wealth-on-hooves* and as a medium of cultural rite of marriage relationships through payment of dowry. The

optimistic wait and see attitude, with households hoping that the pasture situation would improve in a coming season, resulted in emaciated cattle when the undesired scenario of no-rains-no-pasture unfolded. Consequently, there was distress sale of near-dying livestock at throwaway prices. This cultural attachment to livestock therefore reduced the effectiveness of market exchange as an adaptation practice and therefore positively confirmed the hypothesis that attachment to *wealth-on-hooves* jeopardised household adaptation practices. It was concluded that this cultural value is socially constructed. Hence the decision to sell fails to meet the economic rationality propagated by rational choice proponents. This adds more impetus on grounding adaptation debates on people's life-worlds.

The last of the empirical findings, presented in chapter seven, focused on examining how constraints to household adaptation practices were reproduced. It sought to elaborate the claim that self-help groups were sites and tools through which unequal power relations were played out, thereby nurturing a status quo that made constraints to household adaptation practices remain largely unaddressed and unchallenged. It reviewed the practice of external actors' interaction with households through self-help groups to reveal how unequal power relations were sustained. It was established that formation and existence of most community self-help groups in Mwingi were supply-driven, as external actors – governmental, non-governmental and private sector organisations – attempted to fulfil their mandates in terms of volume dimensions. It was established that while the selling points of working with self-help groups revolved around a discourse of empowering vulnerable dryland communities, improving their asset base and its productivity as well as capacity building to engage in productive livelihoods, the underlying motivations and assumptions thwarted the achievement of these objectives. Beyond the rhetoric of community empowerment, it was concluded that there was subtle and veiled unwillingness to address the structural bases of vulnerability that relate to power relations and redistribution of resources starting from the macro governing structures. Government departments were observed to be crippled with inadequacies in staffing and operational resources. NGOs dared not take a confrontational stance in their support to the local populations lest they lost their approval of operating in the region. The private sector, particularly micro-finance institutions are profit driven with their attention sharply fixed on the health of their balance sheets. The support to the community through self-help was in itself too small, scattered and uncoordinated, thereby rendering itself difficult to evaluate beyond the numbers of training workshops held or water pumps distributed. Assumptions of inherent entrepreneurial abilities of community members contributed to the collapse of enterprises the

members started, subsequently rendering them incapable of servicing expensive loans advanced to them. Household assets were then liquidated to off-set the loan balances, thereby depleting the very asset base the enterprises were intended to improve. As a result, the loans were increasingly shunned. The assumption of the local community as a homogenous group posed possibilities of exclusion of some of its members. Self-selection of membership, stringent membership conditions, internal conflicts and patriarchal controls determined who joined the groups, who remained and who did not. Literacy requirements and skills for funding proposal writing discriminated against groups which could not fulfil these requirements. Those not in groups and those who were not able to reach out for the external support remained outside of the coverage ring.

On these grounds, it was concluded that it is highly unlikely that the approach of self-help, whether for mainstream development or climate change adaptation policy and practice, delivers the highly desired robust households that can uphold their well-being in the face of climatic and non-climatic stressors. Consequently, the recent entry of adaptation to climate change discourse to the local level with an increased motivation for communities to step up self-help organisation may be but yet another medium of maintaining the status quo of contextual vulnerability while protecting vested interests and power relations. The findings of chapter seven also supported the hypothesis that the practice of self-help through community groups facilitated by governmental and non-governmental, private organisations and even politicians could be contributing to masking and maintaining imbalances of power relations.

Overall, the findings of this study have theoretical, methodological and policy implications. Given the role played by climate in household well-being and considering that climate is not the only stressor that households face, it is prudent that debates around adaptation, particularly at household level, be not limited to assessments of the characteristics of climate risks. This, as has been demonstrated can be reversed by changing the approach in adaptation studies from starting with a focus on climate risks, to starting with a focus on well-being of the people who experience the impacts. Adaptation, conceptualised through household well-being, is attractive for the following reasons: First, it resonates with local people's needs irrespective of their priority ranking of household risks, be they climatic or non-climatic. A well-being-based approach offers flexibility and multi-edged win. Secondly, this would contribute to resolving two conceptual challenges of adaptation under the dominant debates: (i) the burden of proof that adaptations are indeed formulated with climate risks in mind considering that the households have to deal with multiple stressors; (ii) the question of whether people are adapting to

climate change or variability. Lastly, it allows for critical reflections on the social processes that interact with the natural world to constraint ability of households to uphold well-being in the face of climatic and non-climatic stressors.

Approaching adaptation from the perspective of well-being invites not only a new set of methodological tools to adaptation studies, but also adds the array of expertise in the debates by increasing the inclusion of critical social science. The findings contribute to exploring opportunities for real inter-disciplinarity in climate change adaptation studies. Such an approach would then offer a broad and rich range of issues central to the nature of socio-ecological systems.

From the findings presented in this thesis regarding adaptations strategies by the rural households of Mwingi, the following results were established: climate risks are a normal part of the local livelihood; impacts of climate risks cannot reasonably be separated from impacts by other changes; households make effort to deploy a mix of adaptation practices; and, the choice and effectiveness of these strategies are constrained by social structures embedded in the socio-economic, institutional, political, and cultural settings of the society. These elements of social structure render the full potential of adaptation strategies to remain undeveloped and unrealised. Consequently, the adaptation strategies only manage to only keep the local population alive in the face of external risks in general and climate risks in particular. For adaptation policy to be meaningful and relevant to the local people, it needs to focus on these constraining social structures in a coherent way in order to develop a platform on which adaptation practices can provide value to households' well-being. By so doing, vulnerability would be reduced, and local households will consequently have the capacity to adapt their livelihoods for climatic and non-climatic stressors.

Four further areas of research are proposed: i) in-depth research into particular social factors for detailed insights; ii) conflicts as they relate to household adaptation as well as connect to macro social processes; iii) a critical review of government's emerging climate change policies and institutional frameworks as well as the practice of various government ministries, departments and agencies to help link the challenges of household adaptation at the local level to weaknesses in the national policy strategies; and iv) research for options that can positively influence these social structures that constrain household adaptation abilities.

CHAPTER ONE

EXPANDING THE SCOPE OF ADAPTATION

1.0 Introduction

For the drylands communities in general and the Kamba community inhabiting the semi-arid region of Mwingi/Kenya in particular, climate risks are a normal part of their livelihoods. They are aware of the precarious nature of their climate and weather, and deploy a variety of strategies to protect livelihoods in the face of the resultant climate risks. However, these strategies are largely undeveloped. Their potential to transform livelihoods in order to make them robust to impact of weather and climate changes remain under-realised. Water crisis, food crisis and loss of livestock crisis are consequently perennial problems with every occurrence of drought. A multitude of external interventions including a permanent food aid programme are the most conspicuous indicators that local livelihoods are far from being robust in the face of climate risks. This thesis is concerned with understanding household adaptation practices in the face of climate risks by exploring the context that contributes to the undeveloped status of these practices.

In climate change studies, most research on adaptation is based on the claim that adaptation reduces vulnerability to impacts of climate change. This claim limits the scope of adaptation to impacts only directly linked to the climate stimuli. This thesis takes a less explored path, with the claim that adaptation is enhanced by vulnerability reduction; that vulnerability reduction enhances choice, uptake and effectiveness of adaptation practices. The difference between the two is epistemological. The thesis is concerned with explaining households' adaptation practices in the face of climate risks. Based on a drylands context, the thesis explores a scope of adaptation that addresses households' well-being in the face of impacts of drought. The research findings from empirical study in Mwingi, Kenya, contribute to broadening perspectives to the emerging theory of adaptation to climate change. This chapter introduces the study background and objectives as well as situates it in academic debates.

Adaptation to climate change as a global discourse[1] and its translation into material practice is slowly trickling down to specific local sites where communities are envisaged to experience first-hand impacts of predicted changes in climate. This is as a result of an increasing scien-

[1] Benton and Short (1999:1) define discourse as "..whole sets of ideas, words, concepts and practices". Benton, L. M. and Short, J. R. (1999) *Environmental Discourse and Practice*. Blackwell Publishers: Oxford.

tific and political consensus[2] that the world's climate is warming with likely positive and negative consequences in different regions of the earth. Taking measures to reduce damage resulting from the negative consequences or taking advantage of positive ones is championed as a necessity and has been the root-stock of adaptation to climate change, at least in the dominant climate discourse (Boko *et al.* 2007; Learly *et al.* 2008; Richardson *et al.* 2011). Countries subscribing to this discourse are therefore required, and in the case of developing countries, facilitated to take concrete actions towards materialising adaptation to climate change in their respective territories. Kenya, on its part, prepared and submitted its *First National Communication* to the Conferences of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) in 2002. In 2010, the country launched a *National Climate Change Response Strategy* to guide implementation of its international commitments of adaptation to and mitigation of climate change. The same year, a *Climate Change Bill* was drafted and popularised around the country. The *Bill* would provide legal basis for the formation of a governmental authority to oversee implementation of the adaptation and mitigation policy recommendations of the newly formulated *Climate Change Response Strategy*.

For the largely poor rural pastoral and agro-pastoral population living in the drought-prone arid and semi-arid regions of Kenya, the climate change adaptation discourse enters into a scene that is already familiar with climate hazards. Drought in particular is rated as the most significant climate risk due to its enormous negative social and economic impacts both at local and national levels (Mogaka *et al.* 2006). At this local level, impacts relating to food security, access to water and livestock pasture, and general loss of livelihoods are devastating. During the 2006 drought for instance, nearly 3.5 million Kenyans required food aid and other humanitarian assistance. Livestock losses of up to 70% were reported in the arid and semi-arid lands (UNEP/GoK 2006:28). On 16 January 2009, the Government of Kenya (GoK) announced[3] that over ten million Kenyans faced starvation due to massive food shortages resulting from an on-going drought, and made an international appeal for food aid. Climate risks and particularly drought, have therefore been the object of multiple interventions by both development and disaster risk management actors in the drylands of Kenya. This raises interest to observe how adaptation is conceptualised by governmental and non-governmental actors on

[2] Four technical assessments reports have been published by a team of scientists under the caucus of Intergovernmental Panel on Climate Change (IPCC), while countries of the world have severally met to debate on how to implement measures proposed to manage the impacts of climate change. Global decadal gatherings include the 1992 Earth Summit in Rio, the World Summit for Sustainable Development in Johannesburg in 2002 as well as Rio+20 Conference in Rio de Janeiro in 2012.

[3] Kenya newspaper - *Nation Newspaper*, 17th Jan 2009.

one hand and the local people on the other, and the implication this has on household adaptation practices. The following excerpt from field notes best illustrates the divergence in perceptions, from which this study derives its problem:

> "The day is 6th May, 2010. The venue is the village market centre of Kavuvw'ani sub-location. The centre receives guests from the Kenya Climate Change Working Group (KCCWG)[4]. There are over 40 community self-help[5] groups from Mwingi region. The groups, mainly comprising women, are involved in a wide array of activities ranging from goat rearing, planting trees, bee keeping, vegetable growing, aloe vera soap-making, sisal baskets making, to helping orphans and organising funerals. They have been invited to the "Mwingi climate change hearing" workshop. The objective of the workshop is to "highlight impacts of climate change within the Mwingi district; create awareness and get inputs on the proposed (national) Climate Change Bill, as well as brainstorm on the possible climate change interventions in the area". The participants have been invited to give their views on the changes in climate that have taken place in their region and to recommend what needs to be done about it as part of contributing to the Climate Change Bill that is under preparation.
>
> After the self-introductions, the gathering is taken through the Climate Change Bill by one of the guest speakers. The participants are informed that the climate is changing, and the proposed Bill would ensure that the right measures are taken through a law. The participants are then invited to organise their input into the Bill by discussing five questions: "What is climate change? What are the causes of climate change? How has climate change affected people in this area? What can be done to arrest the effects of climate change? What can be done by individuals, government, NGOs in the area to reduce climate change?"
>
> An opportunity to address the local community is given to a spokesman of a political caucus – *Bunge la Mwananchi*[6] to greet the people. The spokesman talks in general about the role of his forum, also known as People's Parliament. He continues by addressing contemporary challenges facing the people of this region. He links local people's lack of access to water to poor leadership – he refers to it as leadership without a vision. This assertion is followed by a loud applause from the listeners. He makes reference to the new Kenya Constitution[7] that guarantees every citizen basic needs and reiterates that a government that does not fulfil such a pledge should resign. He touches on devolution of resources and leadership as espoused by the new constitution and warns the listeners to watch out for devolution of corruption. He makes reference to the region's resources such as stones and sand, which are used to build urban centres in the country yet no structures exist to redistribute the benefits from such resources back to the region. On livestock, he reiterates that there should be a meat factory in the region to cater for the livestock produced in the region and provide employment to the many unemployed youth. Another big applause follows. It seems he is touching on what really matters to the people, but the moderator of the gathering makes several attempts to take over the microphone as the speaker is taking too much time, yet his message was not the core agenda for the gathering. He had been invited to the floor

[4] Kenya Climate Change Working Group was formed in 2009. It comprises civil society organisations and donor partners in Kenya. It has the mission to participate and lead in the development and implementation of climate change policies, projects and activities to minimize the vulnerability of people. http://www.kccwg.org/

[5] The everyday use of the term "self-help" refers to individuals who come together to address a common issue such as pooling financial resources and labour for agreed on tasks. Conceptual perspectives as well as its practical usage is explored in section 7.1

[6] *Bunge la Mwananchi*/People's parliament is a group that purports to be the ordinary citizen's forum for inclusive and participatory pro-people engagement in governance and development agenda in Kenya. They have their base in Nairobi and hold open air proceedings at Jeevajee Gardens in Nairobi. http://www.peoples-parliament.org/

[7] Kenya passed a new constitution on 4th August 2010.

to only greet people and say one or two words about his organisation's work! Finally he is out of the podium.

Another guest takes the podium to summarise the proceedings of the day. He calls on the local community to change behaviour/actions in order to change the situation (climate change). From the input of the participants on the causes of climate change, he points out that most of the issues raised rest responsibility on the people themselves – cutting trees for charcoal production and sand harvesting are undertaken by locals not outsiders. He implores the participants to take action from household level to community level and calls on government and other agencies to support these initiatives".

1.1 Adaptation in official talk

The official talk on adaptation to climate change draws authority from the international science provided by the Inter-governmental Panel on Climate Change (IPCC) to make claim that climate change is a reality and an urgent threat (Parry *et al.* 2007) not only to the country's development but to the livelihoods of the local people. By gathering local people's input into a national blueprint for climate mitigation and adaptation planning i.e. Kenya's climate change legislation bill, this representation assumes that local communities share the meaning of climate change with science; that climate change is a key priority to the local people and all that is required is awareness so that they can take action to manage its impacts. It also assumes that impacts relating to experienced local climate exist in isolation from other household stressors and can therefore be dealt with on their own. Yet, as Roncoli (2009) asserts, people have to deal with multiple stressors:

> In making livelihood decisions, people constantly juggle different kinds of risk, not only related to climate variation but also to livestock diseases, price fluctuations, violent attacks, legal prosecution, and social marginalization (Roncoli 2009:100).

By so doing, this representation misses out on the social processes involved at local scales where climate goes beyond being a material phenomenon to enter into the social life-worlds of people through what Brace and Geoghegan (2011:6) refer to as the "subtle real and imagined, past, present and future changes in the configuration of land and weather". In practice, local people's definition of climate, characteristics and its meaning in their lives are influenced by their day-to-day living experiences (Roncoli *et al.* 2009:97). The subsequent practices relating to climate are moulded by these perceptions and experiences. An attempt to debate climate adaptation at this scale must therefore be founded on the complexities of the local settings.

Use of English language concepts from the master narrative of climate change by the environmental activists and bureaucrats brings with it authoritative elements presenting superior knowledge and authority (Wisner *et al.* 2012:10). This top-down approach casts doubt that it

succeeds in enrolling the local population to adopt recommended practices and change their behaviour. In addition, where the official representation recognizes the notion of vulnerability of rural populations, vulnerability is reduced to two elements - subsistence dependence on rain-fed agriculture and drought, thereby leaving out the role of the wider set of social and political root causes of vulnerability (Wisner *et al.* 2004). The well-being of the rural community is therefore defined through agricultural livelihood production whose prospects are portrayed as rudimentary[8], unambitious and wholly at the mercy of the vagaries of climate. As a consequence, the local people are to be guided on what they need to do to overcome the climate challenges. This view resonates with what Jennings (2011:239) refers to as the "neoliberal retreat of the state in which responsibility for social and environmental problems are shifted to the individual". There is little acknowledgement of the crucial role of issues of governance, equity and justice as the matrix within which farmer and herder livelihoods and adaptations therein take place (Wisner *et al.* 2012:5) such as those brought out by the representative of *Bunge la Mwananchi* despite clear resonance to the needs of the people. It is notable that arid and semi-arid regions of Kenya are the most under-developed as a result of years of economic and political marginalization, coupled by inappropriate development policies[9] (Orindi *et al.* 2007; Walker and Omar 2002; Omiti and Irungu 2000). Yet, this official perspective is not interested in the traps that prevent the local people from embarking on trajectories that would make their livelihoods robust even in the face of climate stressors. Instead, it places blame on the local people, terming them the degraders of their environment.

The characterisation of the cause of people's susceptibility to harm naturalizes vulnerability (Wisner *et al.* 2012), enabling the governmental and non-governmental actors to take an upper hand in defining the boundaries of vulnerability as well as the scope of solutions – the adaptations to its redress, hence the ubiquitous agreement that adaptation reduces vulnerability. By so doing, a holistic perspective of vulnerability does not emerge, particularly perspectives, which the very external actors' may be contributing to intentionally or as an unintentional consequence of their narrow definitions and ensuing practices. The result is a scenario that Wisner *et al.* (2012:1) liken to Ferguson's (1994) "anti-politics' machine", where adaptation consists of "expertly designed, neutral interventions that depoliticise vulnerability".

[8] The Tanzanian president Mr. Kikwete has publically regarded subsistence agriculture as backward, justifying a need for its transformation into a modern commercial-oriented one (Kikwete 2007:8).

[9] Example - Sedentalisation policies that have resulted in individualisation of land ownership limit mobility as a pastoral practices.

Based on these observations, this study uses a bottom-up approach to understand the local level adaptation in the face of climate risks. Specifically, two aspects are of concern: (i) how local people perceive and define their climate life-worlds, a perspective largely missed by the official talk; (ii) the role played by vulnerability factors embedded in the social, economic, cultural, political and historic backgrounds which lay foundation to local people's adaptation practices.

1.2 Study objectives

The overarching objective of the study is to come to a more relevant understanding of what adaptation means for individuals and households in a peripheral area like Mwingi in order to offer an alternative conceptualisation of adaptation. To realise this objective, the study is guided by the following specific objectives:

i. To understand households' perceptions of climate and impacts of climate risks on their well-being.
ii. To explore the conditions under which households choose and undertake adaptation practices.
iii. To examine how constraints to household adaptation practices are reproduced.

The study is based on the following hypotheses:

i. Households perceive climate through the role of weather in their livelihoods. Climate change or climate variability are categorisations whose differences get blurred at the local level.
ii. Households deal with multiple risks, climatic and non-climatic. This presents a methodological challenge in studying households' adaptations. An inclusive rather than exclusive methodological approach is necessary.
iii. Market failure has a significant role in defining the conditions under which households choose and undertake adaptation practices.
iv. Food aid neither hinders nor facilitates households in undertaking adaptation practices.
v. A culture of *wealth-on-hooves* jeopardises household adaptation practices
vi. The practice of self-help through community groups facilitated by governmental, non-governmental and private organisations facilitates to reproduce vulnerability of local people.

1.3 The study area

As a high-profile frontier area, the predominantly semi-arid *Ukambani* region which constitutes part of eastern Kenya has been, for more than a century, at the centre of environment variability/development crisis and intervention in Kenya (Rochelleau, 1995). It is in this region that Mwingi, the study site is located. The region is classified as semi-arid, receiving a rainfall range of between 400 mm and 800 mm per year. This rainfall is characterised as errat-

ic and therefore rather unreliable for rain-fed agriculture. The climate of the region is hot and dry for the greater part of the year with maximum mean annual temperature ranging between 26^0C and 34^0C and minimum mean annual temperatures between 14^0C and 22^0C. The area's soils are of low fertility and prone to erosion. Indeed, it has a long history of land degradation and soil and water conservation form the bulk of external interventions facilitated by governmental and non-governmental organisations.

Mwingi is a relatively homogeneous region with respect to the inhabitants of the ethnic group of the Kamba[10], and their livelihood practices. The region had a population of 384,948 as per the 2009 population census compared to 303,828 in 1999 (Republic of Kenya 2010) representing a growth rate of 2.6%. It has an average population density of 38 persons per kilometre. More than 95% of the population is rural-based while 5% is the urban population, of which, Mwingi Town has 4% while the rest is distributed in small urban trading centres. Poverty levels are high at over 58% of the population living below the poverty line of less than US$1 a day and a high dependency ratio of 1.46:1 (Republic of Kenya 2007).

Mwingi region frequently experiences droughts, which result in crop failures and massive shortage of water and pasture. The food shortage crisis that results is thus attributed to drought, precipitating in declaration of regional or national disaster depending on the spread. Between 1990 and 2011, six droughts have been declared national disaster emergencies 1992-93, 1995-96, 1999-2001, 2004-2006, 2008-2009 and 2011. The droughts are viewed as the cause of impoverishment of the people, thus inviting external interventions in forms of development and humanitarian aid. These mainly focus on strategies for accessing water and food. The interplay and causal relationships between droughts and people's impoverishment make the region a suitable case for this study. The study challenges this logic in its endeavour to expand the scope of adaptation. Chapter 3 provides more details about the study area as a background to understanding the contextual vulnerability that underlies adaptation practices.

1.4 Situating the study in academic debates

Although adaptation studies have recently gained prominence in climate research, managing livelihoods under external stressors is not new. The field of disaster risk reduction (DRR) has

[10] The *Kamba* (also called the *Akamba*) is a Bantu ethnic group residing in the semi-arid Eastern Kenya. The *Kamba* make up about 11% of Kenya's total population. The *Kikuyu* are the largest ethnic group, making about 22% and occupy mainly the central parts of Kenya. The *Luhya* are the second largest and predominantly occupy western Kenya while the *Luo* are fourth and occupy the region around Lake Victoria.

been instrumental in informing management of disaster risks such as droughts, floods and earthquakes. These studies view vulnerability as not only an element of exposure, e.g. living in drought prone areas, but also as an element of the intrinsic characteristics of the social group at risk. Thus the people of Mwingi would be regarded as vulnerable not only because of living under sub-optimal climatic conditions given their nature of livelihood production, but also due to the high poverty levels that limit their alternative options of managing drought risks (c.f. OECD 2009). Cannon and Müller-Mahn (2010) argue that since disasters are socially constructed events given that people's vulnerability is embedded in and created by social, economic and political conditions, adaptation to climate change should also be treated as being socially constructed. By so doing, they reiterate, opportunity is created for bringing out power relations and behaviour of different actors with differing levels of power inherent in the concept of vulnerability.

This study embraces a bottom-up approach[11] to researching adaptation to climate change. It seeks to fill the gap left by many place-based climate change studies which take top-down approaches concentrating on methods of impact analysis that use as a starting point, climate change scenarios derived from global models even though these have little regional or local specificity (Wilbanks and Kates 1999). It builds on the call for social scientists to re-examine discourses of climate change from interpretative humanities and social sciences embedded in a critical reading of the natural sciences (Hulme 2008). In a bid to crudade for the timeliness and necessity of bottom up approaches to understanding nature and culture which are the supra context of adaptation in socio-ecological systems, Hulme (*Ibid*) reiterates that discourses about climate change have to be re-invented as discourse about local weather and about the relationships between weather and local physical objects and cultural practices. He consequently calls on social scientists to play their full part in ensuring local meanings of climate retain their integrity and are more faithfully indexed to the physical dimensions of weather, i.e. situating climate change within a relational context that includes the places people live, their histories, daily lives, cultures or values. Tschakert (2012:152) calls for a focus on ap-

[11] According to Smit and Wandel (2006:285), a bottom up approach to studying adaptation entails the following characteristics: it tends not to presume the specific variables that represent exposures, sensitivities, or aspects of adaptive capacity, but seeks to identify these empirically from the community; it focuses on conditions that are important to the community rather than those assumed by the researcher or for which data are readily available; it employs the experience and knowledge of community members to characterize pertinent conditions, community sensitivities, adaptive strategies, and decision-making process related to adaptive capacity or resilience; and it identifies and documents the decision-making processes into which adaptations to climate change can be integrated.

proaches that allow for diagnosing drivers of marginalisation and barriers to transformative change.

Orlove (2009: 131) notes that adaptation not only comes with conceptual baggage but at times serves larger institutions and interests rather than local people. Critical studies to empirically test the use of the concept particularly in Africa are lacking. Jennings (2011) for instance points to how adaptation to climate change supports specific political agendas including those embedded in globalisation processes. This study aims to contribute to studies in adaptation to climate change through a critical engagement with the processes of adaptation practices of households in Mwingi through vulnerability lenses. The study is informed and aligns itself with scholarship that has cautioned against uncritical reception and perpetuation of the concept of adaptation to climate change.

1.5 Organisation of thesis

The thesis comprises eight chapters. This introductory chapter has served to set the mode of the thesis. The rest of the chapters are organised as follows: Chapter two introduces some key concepts of the study, reviews empirical studies and presents the theoretical and conceptual framework before formulating the research questions. Chapter three positions the study in its biophysical and social settings while chapter four details the methods of data collection. Chapter five is the first of three chapters that present the empirical findings of the study. It seeks to understand households' perceptions of climate and impacts of climate risks on their well-being. Chapter six explores the conditions under which households choose and operationalise a mix of adaptation practices to uphold well-being. Emphasis is laid on conditions that influence the choice or dominance of particular practices as well those that constrain deployment and/or realisation of optimal potential of the practices. The last of the empirical findings, chapter seven, focuses on examining how constraints to household adaptation practices are reproduced. It seeks to elaborate the claim that self-help groups are sites and tools through which unequal power relations are played out thereby nurturing a status quo that makes constraints to household adaptation practices remain largely unaddressed and unchallenged. It does so by reviewing the practice of external actors' interaction with households through self-help groups to reveal how unequal power relations are sustained. The conclusions are made at the individual chapter level as well as also collated in the final chapter. This last section also highlights the theoretical, methodological as well as policy implications of the study findings and conclusions. It presents areas for further research.

CHAPTER TWO

THEORETICAL AND CONCEPTUAL FRAMEWORK

2.0 Introduction

The objectives of this chapter are to provide a background to the key concepts of the study, their definitions and operationalisation, review empirical studies and discuss theories of capacity and choice as a basis for the research conceptual framework and formulation of research questions.

2.1 Key concepts

2.1.1 Adaptation

Although the concept of adaptation has existed for long in the natural sciences and cultural studies, it was the advent of studies in the climate change field that has raised it to global limelight. In the natural sciences, particularly evolutionary biology, adaptation refers to development of genetic or behavioural characteristics which enable organisms or systems to cope with environmental change in order to survive and reproduce (Smit and Wandel 2006:283). In cultural studies, adaptation is considered as a process of change in response to a change in the physical environment or a change in internal stimuli such as demography, economics and organisation, a perspective that broadens the range of stresses to which human systems adapt beyond biological stress (Denevan 1983:401).

Under the climate change debates, an increasing recognition that greenhouse gases (GHG) were leading to the warming of the globe with predicted positive and negative effects, prompted a search for measures to curtail the emission of the gases. In the 1980's, mitigation was high on the agenda of the climate change discourse. However in the 90's, particularly after the UNFCCC in 1992, there was growing acceptance that GHG are long lived in the atmosphere and their effects are cumulative. This meant that some warming of the globe was still inevitable no matter how much further emissions of GHG were cut. It was this stance that saw the swift rise of the concept of adaptation to prominence.

Following this consensus of inevitable global warming, another conclusion was arrived at – that the impacts of climate change due to this warming would be felt most strongly by the poor, majority of whom live in the developing nations of the world (Boko *et al*. 2007). Developing countries were therefore regarded as more 'vulnerable' than their developed counterparts. Tarhule (2012:6) observes that additional boost to the adaptation concept came in 2002 when 10 leading development funding agencies released a report titled *Poverty and cli-*

mate change: Reducing the vulnerability of the poor through adaptation in which they argued that pro-poor development was key to the achievement of the Millennium Development Goals (MDGs) and successful adaptation. The report consequently, placed adaptation into development discourses, thereby increasing its impetus.

According to the IPCC (2007:89), vulnerability was viewed in terms of susceptibility and inability to cope with not only effects of climate change but those of existing climate variability and climate extremes. In other words, IPCC pegged vulnerability on pillars of exposure, sensitivity and adaptive capacity. This placed the concepts, vulnerability and adaptive capacity in the loop of adaptation debates. Accordingly, for a social unit to qualify as vulnerable, it would have to be exposed to a probability of loss (the risk); be dependent on climatic variables (e.g. rain-fed farming); and have low ability to adjust by moderating potential damage, or take advantages of opportunities or manage the consequences (*Ibid* 365). This ability to adjust has also curved its own niche in climate research as adaptive capacity.

Smit and Wandel (2006:284-286) synthesise the evolution and purposes of adaptation under the UNFCCC. In the early years of the convention, the 90s, the purpose of adaptation was to estimate the degree to which impacts of climate change scenarios would be moderated or set off by adaptation to the impacts. According to Smit and Wandel (2006) the analysis of adaptation was hypothetical and aimed to estimate the difference that adaptation could make. Another aspect of adaptation regards specific adaptation measures for a particular entity subject to climate change. The focus is on merits of alternative adaptation measures aimed at identifying the optimal ones based on set criteria. Tools for such analysis may include cost-benefit, cost-effectiveness and efficiency. The third perspective focuses on adaptive capacity or vulnerabilities of countries, regions or communities and involves comparative evaluation or rating based on criteria, indices and variables selected by researchers. Vulnerability is taken as the "starting point" and is assumed to be measurable based on attributes selected a priori. Smit and Wandel (2006) fault all these three perspectives for their general neglect of the decision-making processes under which adaptation measures are taken or the policy processes that deal with the conditions that can alter adaptive capacity and vulnerability.

In a fourth category of adaptation studies, practical adaptation initiatives are the prime focus but rarely under the banner of "adaptation" and not necessarily under the disciplinary category of climate change. When undertaken under the climate change umbrella, Smit and Wandel characterise the work with the following features:

> It tends not to presume the specific variables that represent exposures, sensitivities, or aspects of adaptive capacity, but seeks to identify these empirically from the community. It focuses on conditions that are important to the community rather than those assumed by the researcher or for which data is readily available. It employees the experience and knowledge of community members to characterise pertinent conditions, community sensitivities, adaptive strategies and decision-making process related to adaptive capacity...It identifies and documents the decision-making processes into which adaptations to climate change can be integrated. It is sometimes called a "bottom-up" approach in contrast to the scenario-based "top-bottom" approaches.
>
> (2006:285)

The bottom-up approach work, which is closely linked to "mainstreaming", aims to ensure that risks or opportunities associated with climate or environmental change are actually addressed in decision-making at some practical level. Consequently, adaptation measures under this category are rarely taken in light of climate change alone (e.g. Eriksen 2009; Reid and Vogel 2006; Huq and Reid 2004).

Besides the climate change field, risk, hazards and vulnerability studies, entitlements and food security studies, sustainable development and livelihood security are examples of fields that normally implicitly deal with the practices and processes of adaptation. However, they do not necessarily use the terminology "adaptation". Other qualifying terms include resilience, risk reduction and livelihood security protection. The focus is documentation of how entities experience changing conditions and the processes of decision-making within a natural or social unit, that may accommodate adaptations or provide means of improving adaptive capacity (e.g. Smucker and Wisner 2008; Eriksen *et al.* 2005; Holloway 2003). In the natural hazards field, the focus is on perceptions, adjustment and management of environmental hazards (e.g. Paton *et al.*2001).

In entitlements and food security studies, adaptation is considered as a stress response in light of access to resources and the abilities of people to cope (Adger 2000). A key feature here is its demonstration of how the adaptive capacity of individuals or households is shaped and constrained by social, political and economic processes at higher scales (Wisner *et al*. 2004). Environmental stresses are seen to combine with vulnerability which comprises social forces to culminate in disasters.

The adaptation concept is therefore complex and is better understood through its accompanying concepts of vulnerability and adaptive capacity.

2.1.2 Vulnerability

As noted in the foregoing section, the rise of the concept of adaptation in the climate change field was rooted in the view that some parts of the globe, particularly developing countries,

were vulnerable. This vulnerability was viewed in terms of exposure – prone to droughts, floods, storms; as well as low ability to prepare or manage the resultant impacts due to their low development indices. The co-joining of vulnerability with adaptation has consequently meant borrowing from older disciplines such as natural hazards, poverty and development studies where the term has a longer history.

The literature distinguishes two broad approaches to framing adaptation through vulnerability based on the starting points of analysis. Different authors have labelled them differently, e.g. 'first generation' and 'second generation' (Burton *et al.* 2002); 'top-down' and 'bottom-up' (Dessai *et al*. 2004); 'impacts-led' and 'vulnerability-led' (Adger *et al.* 2004) and 'outcome vulnerability' and 'contextual vulnerability' (O'Brien *et al.* 2007). Since the details of these different labels are to a large extent similar, only two are presented here at length.

Kelly and Adger (2000) have discussed 'end-point' and 'starting-point' approaches to vulnerability. The end-point approach considers vulnerability as 'the end point of a sequence of analysis' that begins with projections of future emission trends, moving on to the development of climate scenarios and then to biophysical impact studies and identification of adaptive options (p.326). This perspective is compatible with the first conceptualisation of adaptation in UNFCCC's article 2 where countries committed to mitigate greenhouse gas emissions in order to avoid "dangerous" anthropogenic impacts of climate change, or realise positive effects. Any residual consequences that remain after mitigation had taken place define the levels of vulnerability. The starting point approach, in contrast, considers vulnerability as a present inability to cope with external pressures or changes, such as changing climatic conditions. This perspective recognises possibility of multidimensional changes or stresses, thus providing room for broad-based interpretations. Vulnerability is therefore considered a characteristic of social and ecological systems that is generated by multiple factors and processes. Kelly and Adger use the analogy of a wounded soldier in the start-point approach and advance that addressing present-day or prior damage will enhance ability to respond to future climate conditions.

Focusing on different interpretations of vulnerability and implications on climate change research and policy, O'Brien *et al.* (2007) label these two approaches as 'outcome vulnerability' and 'contextual vulnerability'. They consider outcome vulnerability a linear result of projected impacts of climate change on a particular exposure unit, either biophysical or social, offset by adaptation measures. Reducing outcome vulnerability involves reducing exposure through climate change mitigation, or developing adaptations to limit negative outcomes e.g. drought

resistant crops. Here, adaptation comprises measures designed after impacts assessment. The impact assessment process begins with the physical climatic system, working towards the human system. Examples include regions (e.g. Coastal, small islands, drylands), sectors (e.g. agriculture, forestry and fishing) or activities (e.g. tourism) (Parry and Carter 1998).

Outcome vulnerability which bears similarities with end-point approaches is faulted for a number of reasons. One, the identification of impacts and adaptations are framed as biophysical. Socio-economic, cultural, institutional features are difficult to quantify to fit into the modelling frameworks. Two, the approach assumes adaptation will occur on a rational choice basis once impacts assessments are undertaken and the information on possible adaptations circulated. Yet, even where full information about alternative courses of action is accessible, optimal adjustments will not always be selected due to resource limitations and other constraints. Thirdly, it fails to address the processes and mechanism by which decisions on adaptation actions occur (Smit and Wandel 2006). Fourthly, adaptation is separated from non-climate change policy and decision-making as adaptation options are largely infrastructural or technological measures. Lastly, there is the tendency to formulate adaptation actions based on future climate change. In many regions of the world, especially Africa, this may attract low priority due to the already engaging long list of pressing short-term issues such as poverty and health (O'Brien *et al.* 2004).

It is the limitations of the impact-based, outcome vulnerability approach that led to vulnerability-led approach to adaptation. Vulnerability-led approach fronts contextual vulnerability as the starting point to adaptation debates. Contextual vulnerability is based on a processual and multi-dimensional view of climate-society interactions. Climate change and/or climate variability are considered to occur in the context of political, institutional, economic and social structures and changes, which interact dynamically in a particular exposure. While climate change or variability modifies biophysical conditions thus altering the context for responding to other processes of change (e.g. economic liberalization, diseases, poverty), these processes also alter the context in which climate change and climate variability occur (see Figure 1 for a graphical illustration). From this perspective, reducing vulnerability involves altering the context in which climate change or climate variability occurs so that individuals and groups can better respond to changing conditions. It is this perspective that supports this study's claim presented in the introduction, that adaptation, conceived in the common-place sense of adjusting to change, is enhanced by vulnerability reduction; that vulnerability reduction enhances choice, uptake and effectiveness of adaptation practices.

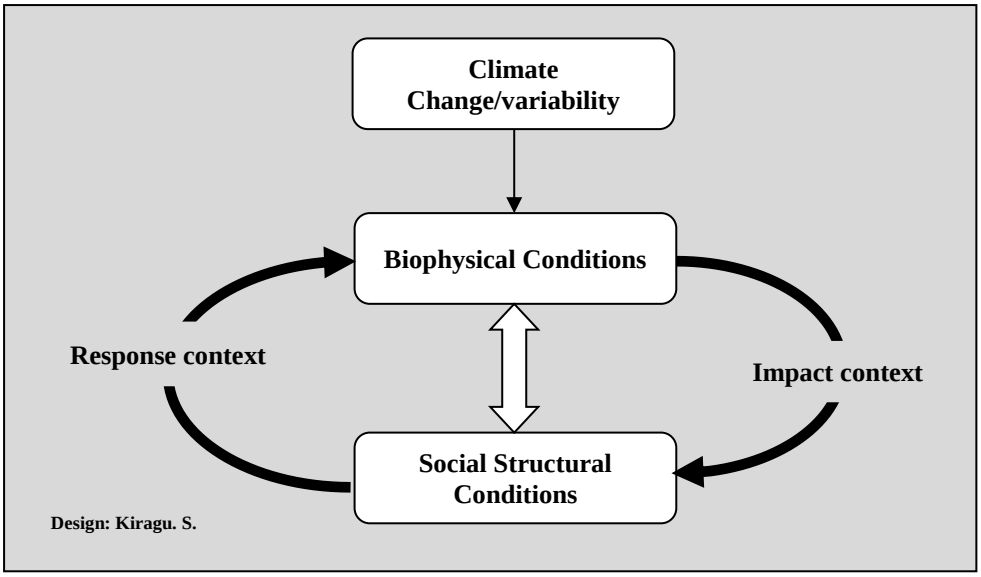


Figure 1: Biophysical and social-structural conditions

The key questions in adaptation studies based on a contextual-vulnerability approach include: who is vulnerable to climate change and why? And how can vulnerability be reduced? (O'Brien *et al.* 2004:6). Because a context-based vulnerability approach to adaptation emphasises determination of where adaptation is needed and how best to design initiatives with stakeholders (Carter *et al*. 2007), attention is on underlying socio-economic, institutional, political, scale, historical and cultural factors that determine how people respond to and cope with climate risks (Adger 2003:6). Accordingly, adaptation begins with an assessment of the broad social and environmental context of a social unit of interest, rather than the climate stimulus (Ensor and Berger 2009). The focus is on the state of the social unit under consideration and the processes and structures determining this condition.

Adaptation practices based on contextual vulnerability put more emphasis on people's capacity to respond to climate stimuli than their propensity to be exposed and sensitivity to them. People are framed as 'active agents' who are 'adaptive' and possessing 'capacity' with which to withstand and respond to climate change (Wisner 2004). This is in contrast to adaptation practices formulated on the basis of outcome vulnerability, where people are framed as 'passive victims' in the face of external threats (Hilhorst and Bankoff 2004). The guiding questions to adaptation practices consequently differ based on the two perspectives due to this epistemological difference. According to Eriksen and Kelly (2000:505), contextual vulnerability-led adaptations are grounded on the question 'what can be done to strengthen people's own capacity to respond and adapt?' On the other hand, outcome-vulnerability-based adaptation practices are formulated on the bases on the question 'what can be done to protect the population?' Figure 2 below illustrates the two perspectives of vulnerability.

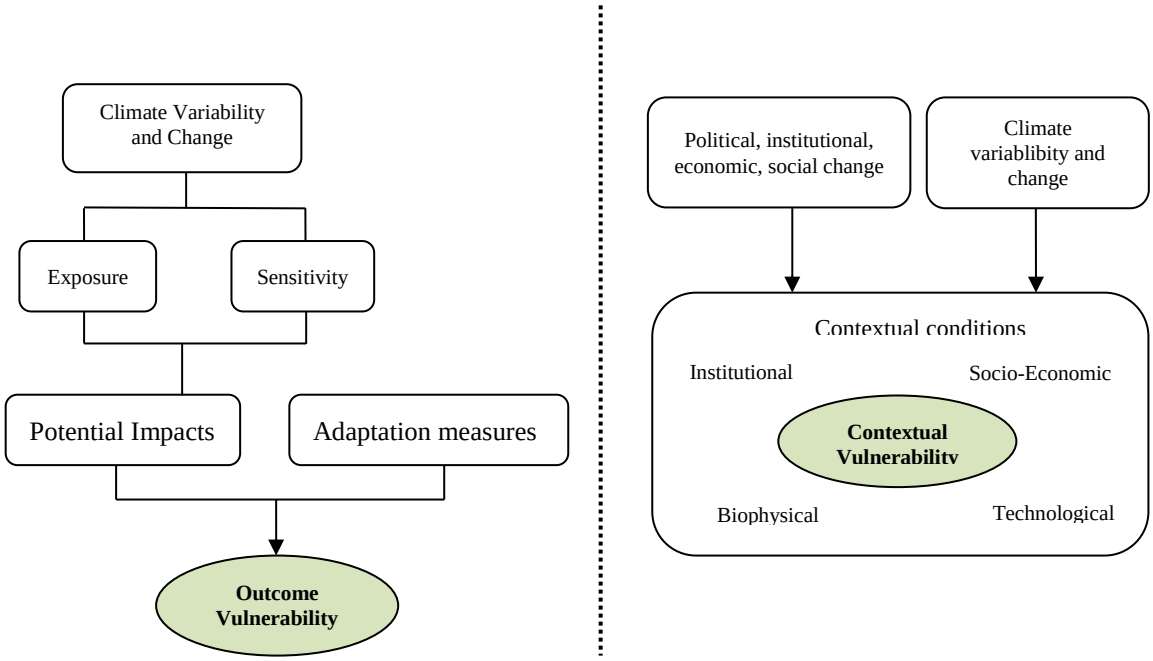


Figure 2: Two perspectives of vulnerability

Source: Adopted from O'Brien *et al.* 2007

Framing and discourses in climate change and vulnerability

The two perspectives of vulnerability presented above relate fundamentally to different framings and discourses of climate change. According to Forsyth (2003), framing of an issue creates boundaries around social groups, biophysical entities or their interactions to establish an ordered vision of events. Framings influence the questions that are asked and structure the kind of knowledge that is produced. They determine what is included on the agenda and what is silenced. On an account of framing, Leichenko and O'Brien (2008) pick out three broad discourses in the climate change debates: biophysical, human environment and critical discourse. They observe that the biophysical discourse frames climate change as a problem of human impacts on the global climate system. Consequently research is focused on understanding biochemical cycles, atmosphere-biosphere-ocean interactions as well as quantification of impacts of climate change. Methods of research comprise mathematical models to develop projections. Under biophysical discourse, borders are drawn between nature and society with the main focus being on nature while society is represented as an item that drives the process and experiences the consequences. Vulnerability is thereby regarded as the negative outcome of climate change on any particular exposure unit. This outcome can be quantified and measured and reduced through reducing greenhouse gas emissions and technical as well as sectoral adaptation measures.

The human-environment framing on the other hand recognises that humans not only drive climate change but are unevenly affected by its consequences. The framing therefore emphasises the linkage between social and physical systems that regard humans as part of the "coupled socio-ecological system" and viewing nature as being inseparable from human activities. The vulnerability research based on the human-environment framing of climate change emphasises the importance of integrating the biophysical and social vulnerability in order to understand how outcomes of climate change are distributed within society. Examples of adaptation measures deduced from this framing include technological solutions and innovations such as development of drought resistant crops that can sustain yields with reducing precipitation. The framing is however based on the assumption that society lacks a critical understanding of what programme, institutional arrangements and knowledge systems can most effectively harness science and technology in the process of vulnerability reduction.

The critical discourse faults the other two discourses on the account that they emphasise biophysical aspects at the expense of social-political dimensions. The discourse argues for a focus on political, economic, moral and cultural dimensions (Wynne 1994). The specific focus is on the role of human beings as social agents with capacity not only of influencing change but also responding in a variety of ways to shape outcomes positively or negatively. Proponents of critical discourse thus emphasise that outcomes are not determined by physical and ecological factors alone; that wider social, economic and political issues must be addressed before environmental problems can be resolved. Key approaches to vulnerability research based on this framing comprise, among others, political economy and eco-feminism. Prominent in this discourse is the emphasis on the importance of power and interests in the social construction of problems.

Leichenko and O'Brien (2008) point out that while the boundaries of biophysical framings are distinct, the one between human-environment discourse and critical discourse is fluid. The outcome vulnerability is closely related to the biophysical framing whereas contextual vulnerability relates to human-environment and critical discourse perspectives. In outcome vulnerability, prioritised questions enquire into the human activities contributing to dangerous climate change as well as the sectors that are likely to be affected. The contextual vulnerability concerns itself with whether climate change is a relevant problem to society and why some regions and social groups are affected more than others. While outcome vulnerability is concerned with future climate change and sectoral sensitivities, contextual vulnerability engages with contemporary climate variability, political economy of society and livelihood and coping

strategies. Outcome vulnerability deploys dose-response methods and integrated assessment methods while contextual vulnerability uses agent-based modelling, indicator approaches, case studies and household surveys. While outcome vulnerability identifies results in terms of gains or losses, sectoral impacts or inappropriate practices, contextual vulnerability identifies winners and losers, key interacting processes as well as institutional and socio-economic constraints to local responses. At the level of policy response, outcome vulnerability leads to recommendations on sectoral sensitivities reduction, technological adaptation measures as well as reduction of greenhouse gases. Contextual vulnerability on the other hand leads to development of policies for addressing local constraints, reduction of inequalities, alternative development pathways, addressing power structures, capacity building and adaptive management.

This study straddles between the human-environment and critical discourse framing of climate change discourse and aligns with contextual vulnerability as prescribed by Leichenko and O'Brien (2008). This perspective relates closely to that used in the field of risk and hazard where disasters are observed to have differential impact on people, not only because of exposure to hazards but also socio-economic and political processes in society, which generate vulnerability. It associates closely with studies that embrace the idea that by focusing on societal structures as cause of disasters, political solutions can be sought so as to address the societal processes that put people at risk (Wisner *et al*. 2004:11; Allen 2003; Heijmans and Victoria 2001; Adger and Kelly 1999). Vulnerability, specifically contextual vulnerability is operationalised as factors that influence the capacity of households to anticipate and manage impacts of external stressors. These factors are embedded in the socio-economic, cultural, institutional and political settings within which households experience external stress.

2.1.3 Adaptation typologies

Smit and Barry (2009:22-28) provide a detailed overview of various types of adaptations based on how adaptation practices are undertaken. The grouping of these types of adaptations is based on timing, role of government, intent, duration, form and intended outcomes. Table 1 below summarises these adaptations. Notable in all these is the emphasis on climate stimuli as the focus for adaptation. They are founded on outcome-based vulnerability and can be implemented by different actors at different levels from global to local. A more integrated framework of how adaptation occurs that is fitting and relevant at household level, is one provided by Agrawal (2010). This framework is also interesting because it is not bound by a sole focus on climate stimuli but instead prioritises support to the well-being of households. Agrawal

classifies adaptation practices into 5 analytical categories by borrowing from Halstead and O'shea (1989:3-5). The first category is mobility, which pools potential losses from climate risks impacts across space. Examples include mobility of pastoralists to take advantage of spatial and temporal structure of pasture and water availability. The second is storage, which pools potential losses across time. Third is diversification, which is concerned with broadening the livelihood base thereby pooling potential losses across assets. Agrawal notes that this form of adaptation practice is varied – 'it can occur in relation to productive and non-productive assets, consumption strategies, and employment opportunities' (p.20). The fourth category is communal pooling which comprises adaptation responses that involve joint ownership of assets and resources, sharing of wealth or labour across households or mobilisation and use of resources held collectively. Potential losses are therefore shared across households. The fifth and last category is market exchange which is regarded as a means to promote specialisation and increase revenue flows. It can replace all the other four categories when there is effective access to markets. The five are to a great extent mutually inclusive in varying complementary combinations. Diversification allows farming households to simultaneously reduce risks as well as reap the benefits of market exchange. A summary of these household adaptation practices are presented in table 2 below. Because households do not compartmentalise adaptation actions, Agrawal's classification allows for capture of the broad array of household adaptations that enhance or uphold household well-being in the face of climate risks. This study uses these five categories to understand how households adapt.

Table 1: A typology of adaptations based on outcome vulnerability

Category	Types of adaptation	Description
Timing relative to climate stimuli	Reactive/responsive/*ex post*	Mainly in unmanaged natural systems
	Concurrent	During
	Anticipatory	Proactive/ ex ante
Spatial scale	Local	Response to localised risks, site specific
	Regional	Regional due to climatic conditions and their effect on economic sectors such as tourism, forestry, agriculture
	National	The potential modification of national building code standards to reflect increased or reduced stresses posed to buildings and infrastructure from an altered climate
	International	E.g. international agreements to accommodate 'environmental refugees' or to address climate induced food shortages or distribution problems
Social scale	Individual decision makers	These are undertaken by individuals/households – e.g. farm level modifications of tillage under a new soil climate regime
	Community/society	Where sufficient number of individuals within a system have adapted to the extent of changing the character of the system
Role of government	Private	Individuals/societies adapt on their own, autonomously
	Public – reactive, proactive	Government takes lead – e.g. modifying port facilities, research, information dissemination, public education, financing and other incentives

Intent	Autono-mous/spontaneous/incidental adaptation	During or after a climate event
	Purpose-ful/planned/deliberate adaptation	Before, during or after: actual or anticipated
Duration	Short-term/tactical	Short-term response to climate conditions; daily, weekly management decisions in response to an immediate stimuli
	Long-term/strategy	Activities running for many years; more enduring, often anticipatory actions made with a long-term view
Form	Technological	Attempts to manage the impact, may comprise infrastructural works e.g. dams or development of drought resistant cultivars
	Behavioural	Activities undertaken through modification practices of individual, groups or institutions e.g. changing timing for field crops or amending zoning by-laws
	Financial, Institutional/ legal, information, market based, regulatory, financial, informational	
Intended out-come	Buffer	Buffering a system from an environmental perturbation. It aims to protect the current activities in the face of environmental change – e.g. in agriculture, development of irrigation systems to sustain crop production
	Change-oriented	Facilitates a shift or evolution to a new state. Strategies are directed towards a direct transformation of the status quo – e.g. a programme of land use planning which freezes development in areas likely to be adversely affected by climate change

Adopted from Smit & Barry 2009

Table 2: Household adaptation categories according to Agrawal

Category	Description	Examples
Mobility	Pools potential loss across space	• Moving livestock away from homesteads to areas with pasture and water • Migration for waged labour
Storage	Pools potential loss across time	• Rain water harvesting • Soil water conservation
Diversification	Pools potential loss across assets	• Planting a wide variety of crops • Keeping a mixed herd of livestock • Engaging in non-farm income generating activities
Communal pool-ing	Pools potential loss across households	• Kinship relations of sharing • Joint ownership of resources
Market exchange	Allows conversion of household asset, Insurance	• Sale of crop produce or livestock • Purchase of weather insurance

Adopted from Agrawal 2010

2.1.4 Adaptive capacity

Conceptualising adaptation through contextual vulnerability lenses lends itself to factors and processes shaping the ability of social units to response to a range of multiple external stressors. The term adaptive capacity is normally used to denote the aggregate status of these factors and processes. This means that enhancing adaptive capacity reduces contextual vulnerability and reflexively enhances adaptation. The adaptive capacity concept is derived from the field of disaster management. According to Gaillard (2010:220), it consists of two parts: the resources and assets people possess to respond to external stresses; and the ability to use and

access the necessary resources. Ability to use and access the necessary resources is embedded on the social and political structures through which distribution of resources takes place (Ensor and Berger 2009).

Enhancing adaptive capacity is a vital component of adaptation practices based on a contextual vulnerability approach. A key component of analysis is factors and processes that enable or constrain adaptive capacity (Reid and Vogel 2006; O'Brien *et al.* 2009). These factors and processes are context and scale-specific (Vincent 2007). Different authors provide a diversity of such factors and processes without consensus of a universal list. However, common mentions include: risk perceptions, education, skills, information flows and governance structures. They are also referred to as determinants of adaptive capacity and based on their status, they enable or constrain adaptation actions.

Adger *et al.* (2004) have classified these determinants as either generic or specific. Generic factors are regarded as those operating at a broader scale such as livelihoods, education levels and economic wealth. Specific factors are those that operate in response to specific external stress and may include available technology and information. This categorisation is limiting as it does not delineate factors linked to an individual entity and those of the social structure. All are put in the same basket.

Others have classified these determinants under over-arching categories of natural, social and human/informational (e.g. Adger *et al.* 2009; Moser and Ekstrom 2010; Jones 2010). Natural determinants are described to comprise the ecological and physical limitations to adaptation, associated largely with the natural environment, ranging from ecosystem thresholds to geographical and geological limitations. The human and informational resource-based limits relate to knowledge, technological and economical restrictions. These include the various spatial and temporal uncertainties associated with forecast modelling, and low levels of awareness and information on the impacts of climate change, as well as lack of financial resources and assistance to facilitate adaptation interventions. Adger *et al*. (2009:3) point out that the attractiveness of conceiving these limits of adaptation under natural and human/informational perspectives is in the analytical functionality that these afford. For instance, ecological and physical limits offer prospects in modelling e.g. agriculture under changing climates. Economic limits lend themselves to investigations through cost benefit analysis. Technology-focused limits put value of effort in technological mapping and innovation e.g. development of new drought resistant crop cultivars or innovative designs for rain water harvesting. These functionalities fit quite well with the outcome-based vulnerability to climate risks.

The social determinants of adaptation offer a view of limits that looks from 'inside society' to analyse how societies are organised, the values, the knowledge they construct and the relationships that exist between individuals, institutions and the state (*Ibid* p.4). They comprise processes relating to cognitive, normative and institutional restrictions that prevent individuals or groups from seeking the most optimal forms of adaptation (Jones 2010).

Cognitive barriers relate to perceptions of how individuals and collectives make decisions in the context of climate risks. These relate to appraisal of both threat and action capacity (Grothmann and Patt 2005). Normative barriers relate to cultural norms that may restrict adaptation decisions – e.g. restricted role of women in a household/community.

Social institutions dictate to a large extent, the appropriate adaptation actions and the behaviour of individuals when faced with the threats posed by external risks. They can restrict access and entitlements for certain groups. They are diverse and can be seen in the form of local household collectives, indigenous knowledge institutions, or collective ownership rights, institutions regulating market, policy and governance (Jones 2010:2). Additional perspectives can be drawn from the natural resource management literature which is rich with studies that focus on cultural and societal norms and rules and how these shape individual actions and behaviour (see Ostrom 2005). Emphasising the role of cultural norms, Tompkins and Adger (2004:15) point out that barriers to individual or community action do not lie primarily in a lack of information or understanding alone, but in social, cultural and institutional factors. It is worthwhile to note that even IPCC has come to recognise the importance of social cultural constraints and acknowledges that they are lacking research attention (IPCC 2007:737). Figure 3 below illustrates these elements of determinants of adaptation in a socio-ecological system.

This study is interested in the elements of adaptive capacity that relate to issues of access and use of resources by households in the process of undertaking adaptation. Specifically, the study benefits from the normative and institutional components located outside the bounds of an individual household yet determine its capacity to enhance its well-being in the face of climate risks.

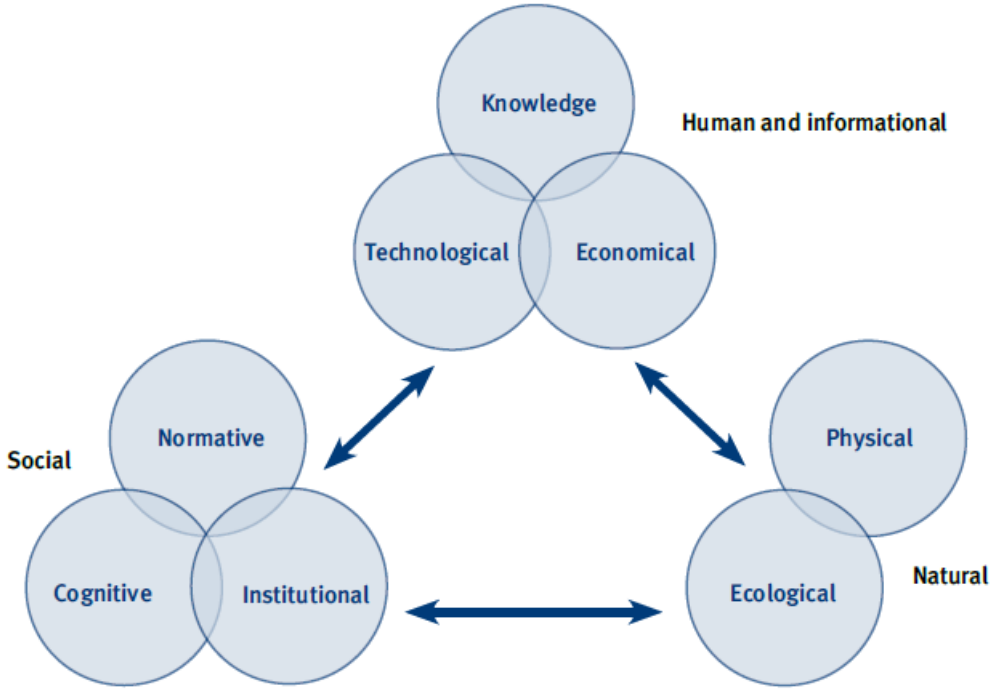


Figure 3: Elements of determinants of adaptation

Source: Lindsey Jones 2010

2.1.5 Operationalising adaptation

The study conceives adaptation from the contextual vulnerability perspective. As indicated above, contextual vulnerability is concerned with nature-society interactions which occur in socio-economic, cultural, institutional and political contexts. Contextual vulnerability therefore determines the ability of households to uphold their well-being in the face of external stresses including climate risks. Reducing contextual vulnerability would reflectively enhance ability of households to sustain their livelihoods even in the presence of climate risks (e.g. improving access of Kenyan farmers to the National Cereals and Produce Board would enable them to receive fair prices and income to support their families' needs for a longer period even with a reduced subsequent harvest due to depressed). Adaptation in this study is therefore operationalised as actions and processes that enhance the ability of households to uphold their well-being in the face of climate risks. The frame within which households experience climate risks provides the contextual vulnerability environment, which in turn enables or constrains households' adaptation efforts. This enables the study to focus, not on "how households adapt to climate risks"; but "how they adapt their livelihood strategies in the face of climate risks".

2.1.6 Climate change, variability and risks

Pelling (2011:7) notes that climate change is a "slippery concept to demonstrate empirically", that outside of the imaginary worlds of computer models, it is as yet impossible to determine the proportion of any hydrological or meteorological event that is attributable to climate change. O'Brien and Leichenko (2003) are considered to be among the first to argue that searching for the incremental risk associated with climate change is a lost cause and many years away from resolution. This notwithstanding, many social and ecological systems bear damage and losses associated with climate. Here climate variability and climate extremes register their candidature as climate change is presumed to manifest itself through heightened occurrence of variability. Indeed, Hulme *et al.* (2005), while writing about future climate change scenarios for Africa, point out the challenge of modelling uncertainties. They suggest that in view of uncertainties, it is important to place emphasis 'on reducing vulnerability to adverse climate-events and increasing capacity to adapt to short-term and seasonal weather conditions and climatic variability". Hence, to avoid falling into the quagmire of burden of proof of whether households adapt to climate change or climate variability, this study adopts a neutral[12] terminology - climate risks, to denote likely losses occasioned by changing conditions of climatic elements, be they due to climate change or climate variability. This approach lays weight on the observation that households in drylands are already living with climate variability and an assumption that even if climate change will manifest itself in a radically different manner as the existing variability, ability to adapt will still be to a great extent pegged on their vulnerability context, for which the current variability offers a suitable study case.

2.2 Literature on empirical adaptation research and its conceptual basis

Climate change debates discuss spatial regions based on their differential nature of predicted impacts (Boko *et al.* 2007; Low 2005; Toulmin 2009). For instance, while glaciers melting would be a major problem to the temperate countries, in the tropics, the problem is limited to only few countries with glacier mountains such as Mt. Kilimanjaro in Tanzania. Majority of tropical countries instead continue to grapple with droughts and floods, which are predicted to increase in frequency with climate change. Africa in particular is singled out due to its low levels of technology and high levels of poverty (Boko *et al.* 2007). The review that follows below limits its scope to empirical work undertaken in Africa.

[12] By neutral I mean the term climate risks does not draw controversy like the climate change.

Past empirical research has shied away from taking critical perspectives in researching adaptation to climate change, choosing instead to take simple linear logics – that the climate is changing and there is need for adaptation in order to reduce negative impacts or take advantage of positive ones. In the context of droughts, majority of local level empirical research themes revolve around perceptions of whether or how climate has changed, decision-making and choices of adaptation actions, vulnerability of households, determinants of adaptation/adaptive capacity and role of indigenous knowledge in adaptation practices. Although some mention in passing the role of contextual social, economic and political factors in vulnerability reduction, this is brought in as secondary to the studies, perhaps just to enrich the outputs. In the following section, a summary of some of these recent studies and their shortcomings is presented. Since a broad range of literature on adaptation to climate change and vulnerability exists, the focus here is limited to those pertaining to rainfall, droughts and farming rural households in Africa.

Local scale empirical work on adaptation in the context of climate risks in general and droughts in particular in Africa focuses mainly on rural cultivating and pastoral communities. Numerous scholars have focused their inquiries on perceptions of climate trends. Rao *et al.* (2011) examined perceptions of farmers towards short- and long-term variability in climate in five districts of *Ukambani* region – Machakos, Makueni, Kitui, Mwingi and Mutomo districts. Their objective was to compare perceptions in climate trends with actual weather observations. They found discrepancies in farmers' ability to synthesise long-term climate trends. They called for exercise of caution in interpreting farmers' perceptions about long-term climate variability and change.

Mertz *et al.* (2009) analysed the perceptions of climate change and the strategies for coping and adaptation by sedentary farmers in the savannah zone of central Senegal. Their work provides important insight on how to research adaptation: they established that when climate was the first issue to be mentioned, people related their livelihoods to climate. When questions on change in land use and livelihood strategies were asked, climate did not feature prominently, but economic, political, and social factors featured as the main reasons for change. Though their study made a significant observation regarding difficulties in attribution of climate as a driver of adaptation practices, thereby acknowledging that people adapt to a range of multiple factors, the work fell short of linking findings to theoretical conceptualisation of adaptation.

Thomas *et al.* (2007) working in South Africa and focusing on village and household level analyses, sought to investigate farmer perceptions of, and responses to, rainfall parameter changes. The study identified a range of specific coping and adaptation strategies employed by farmers to respond to climate shifts, some generic across regions and some facilitated by specific local factors. By singling out one climate parameter, rainfall, the study made a blind assumption that response to one climate parameter can be clearly delineated from response towards other stimuli.

Shisanya and Khayesi (2007) investigated the perception of climate change in relation to 21 socio-economic and environmental problems in a survey in the city of Nairobi. They found that socio-economic security was rated highest as a problem of concern; a rating they explain is based on the context of problems of poverty, unemployment, crime and corruption in Nairobi. This study was undertaken in an urban set up and its findings may have been influenced by the livelihood sources of urban dwellers. A rural setting study would be appropriate for purposes of drawing comparisons.

Nhemachena and Hassan (2007) studied the determinants of adoption of adaptation measures by farmers in 11 African countries. Using a multivariate probit model, they matched a selection of 7 common adaptation measures against a list of socio-economic factors. They concluded that farmers' adaptation decisions are influenced by household characteristics, resource endowments and access to information as well as availability of formal institutions for smoothing consumption. They drew their recommendations in favour of expansion of irrigation, development of crop varieties and animal breeds that are tolerant to heat, water and low fertility stresses, without questioning why the current status of these factors had not eliminated vulnerability.

Asante *et al.* (2012) examined the determinants of adaptive capacity of Ghanaian farmers to cultivation innovations and technologies introduced to them with the focus of adaptation to climate change and variability. These were construction of dugout water dams, innovations in transplanting sorghum and millet and organic matter and compost use. These were regressed against a selection of capacity variables such as age, education, knowledge and extent of use, availability and accessibility. The findings were regarded as essential for intervention policy formulation. The study laid more emphasis on household characteristics while being shallow in probing structural factors.

Ozor *et al*. (2012) sought to identify the key constraints to climate change adaptation among smallholder farmers of southern Nigeria. They used a household survey to study the socio-economic characteristics and problems encountered by the smallholder farmers in managing climate risks. They subjected their data to factor analysis with varimax rotation to sieve out the most prevalent constraints. These were found to be: land access constraints, poor climate change information and agriculture extension service delivery, high cost of farm inputs and processing facilities, high cost of irrigation facilities and government irresponsiveness to climate risks management credit constraints, labour constraints and income constraints. While the study was able to highlight contextual issues constraining adaptation actions of small holder farmers, its methodology, limited to a household survey and quantitative analysis missed the opportunity to probe how these constraints were embedded into the structures of society.

Reid and Vogel (2006), adopting a situational approach[13] (Wisner 2004) undertook an assessment of factors that shape vulnerability and adaptation to various stressors including climate risks. They employed the sustainable livelihoods approach (SLA) to argue that a focus on climate risks alone does not enable a full understanding of the host of factors that combine to configure risks and heighten vulnerability of households to periods of climate stress. They established that climate was not the only stress on livelihoods in the area of study. Health risks, particularly HIV/AIDS, poor access to basic amenities such as infrastructure and transport and unequal access to irrigation water competed for households' attention in sustenance of livelihoods. Structural and governance structures of the local community as well as social relations, power relations between the community and local administration accounted for the constraints in undertaking adaptation practices. These findings are interesting to this study for a number of reasons. First, it comes close in methodology – it focuses on livelihood sustenance as the goal of adaptation and hence allows climate risks to be rated together with other livelihood risks. Second, the focus on livelihood allows constraints to be assessed be-

[13] Wisner (2004:184-188) discusses four approaches to assessing social vulnerability: demographic, taxonomic, situational and contextual/proactive. He elaborates that situation approach treats vulnerability as a multidimensional concept and as a dynamic process. Existence of vulnerability is treated as an empirical question to be determined by examining the nature of the actual situation and the reality of every day live. Whether vulnerability is experienced depends on the specific hazard, the characteristics of the persons and the characteristics of the situation. Under the approach, vulnerability is regarded not as a property of groups but rather as an outcome of economic, social and environmental conditions. Research from this perspective conceptualises vulnerability as fluid and socially constructed rather than a fixed objective.

yond climate risks. However, its theoretical approach does not enable the work to provide enough depth into how the situational factors come into being.

Paavola (2008) looked at livelihood responses to climate variability and other stressors in the Morogoro region of southern eastern Tanzania. These included cultivation expansion, reduction of fallows, crop switching, wage employments, charcoal, timber and brick production. The farming practices were linked to non-climatic environmental changes such as land degradation due to soil erosion and deforestation, which in turn fed into difficulties of providing livelihood safety nets. Access to markets, to public services and to utilities were identified as key hindrances to those living in remote villages. The study consequently recommended the need to safeguard the natural resource base, promote market access and augment human capital through skills and knowledge. Like the work of Reid and Vogel (2006) this research was successful in unearthing the hindrances to livelihood responses but was limited in probing their roots.

Deressa *et al.* (2008) looked at factors affecting farmers' choice of adaptation methods and perceptions of climate change in the Nile Basin of Ethiopia. Their approach regarded farmers as economic agents, whose adaptation choices are driven by perceived utility or net profit from the practice. Using multi-logit model, data on preselected six adaptation options was analysed against a set of explanatory variables namely household characteristics, access to information and social capital. The study concluded that the household characteristics (age, gender, level of education, income), access to information and social capital were the key factors in the choice of the studied adaptation practices.

In a review of pastoral livelihood adaptation to droughts in Kenya, Orindi *et al.* (2006) acknowledged the concurrent stressors on pastoral livelihoods from drought impacts as well as impacts from political, economic and environmental threats such as land degradation. Their analytical framework however led into findings that avail themselves for more ameliorative interventions, than transformation of the underlying factors that they point out in their study.

Kabubo-Mariara (2008) examined the impact of climate change on the choice decision of farmers to engage or not to engage in livestock activities, and the choice of different livestock species - dairy cattle, beef cattle, goats, sheep and chickens. Using multi-variate probit model, the study concluded that with increased warming, farmers were more likely to reduce dairy cattle for beef cattle as well as substitute sheep with goats. The study recommended the need

for monitoring climate change and information dissemination to farmers as well as education to farmers on species vulnerability.

Another popular theme of scholarly investigation in adaptation research at local levels is indigenous knowledge (Ifejika Speranza *et al.* 2008; Nyong *et al.* 2007; Eriksen 2005). These studies contend that indigenous knowledge has been and can make valuable contribution to vulnerability reduction. They search from within local communities for problem definition with no linkage to extra local factors that limit their optimal deployment for vulnerability reduction.

This research leans closely to the work of Eriksen and Lind (2009) who view adaptation as a political process. Researching on droughts and conflicts in the dryland Kitui district of Kenya, these scholars sought to investigate how local people seek to access livelihood adjustment options and promote particular adaptation interests through forming social relations and political alliances to influence collective decision-making. They found that in the face of drought and conflict, relations are formed among individuals, politicians, customary institutions, and government administration aimed at retaining or strengthening power bases in addition to securing material means of survival. They also linked national economic and political structures and processes to people's capacity particularly through the unequal allocation of resources across regions, development policy biased against pastoralism, and competition for elected political positions. Based on power relations, their results identified winners and losers in the adaptation process. This work differs from Eriksen and Lind's (*Ibid)* by taking on external actors' roles and practices as key drivers of contextual vulnerability.

The studies on perceptions of climate change have their starting point based on climate science - that global (and by extension, local) climate is changing, and proceed to counter-check whether people are aware of this fact or not. If they are aware, they should be doing something about it – undertaking adaptation measures; if not aware, then awareness creation is necessary. This approach is narrow and subjective. It misses an opportunity to study the place of climate in the everyday lives of people, from which adaptations can be derived.

Common in most of these studies is their narrow problematisation of adaptation whereby the focus is on the nature of climate risk. Eriksen and O'Brien (2007) observe that such a narrow perspective leads to adaptation efforts focused on reducing risk while underplaying the societal processes that generate contextual vulnerability. They highlight that addressing contextual vulnerability in the adaptation planning, allows for conceptualising adaptation actions not just

as a local activity but also one that addresses economic and political structures inherent in processes that generate vulnerability.

Another gap in these studies is the inward-search for explanation of adaptation choices and decision-making. Household characteristics ranging from age, education, gender, size of land, income to number of relatives are analysed through complex quantitative analysis models against a list of selected adaptation options. On one hand, the inward search, focusing on household characteristics plays to overshadow factors of social structure such as institutions and power relations. It limits the scale range under which choices are made, yet individual choices are shaped not only by local conditions but also by regional, national and even international conditions. The quantitative methods adopted in these studies, create little room for narratives that bring out how these structural factors play out in the everyday lives of rural people. For instance, why is access to credit problematic? What processes of market access precipitate a constraint? This inward search thus leads to neutral recommendations such as provision of credit, provision of climate forecast information, information on adaptation technologies, more awareness, while steering away from the sensitive arena of politics of governance, equity and justice in resource allocation and decision-making. Given the method's shortcoming, Roncoli (2006) recommends qualitative methods, noting that:

> Because these (adaptation) strategies are complex and culturally embedded, they are not easily captured by snapshot assessments and structured surveys. Participant observation and in-depth interviewing are more suited to elucidating the intricate decision-making processes and the influences and negotiations that shape them (Roncoli 2006:14).

In a nut shell, the empirical studies have fallen short in a number of ways: though acknowledging that people adapt to a range of multiple factors, little linkage is made to the theory of adaptation; by singling climate elements to study adaptation, the studies assume that household clearly delineate responses to climate from those from other stimuli; they fail to address contextual factors embedded in social structures of society; and, they prioritise quantitative methods, which miss the opportunity to show how constraints are reproduced in society. This study focuses on one knowledge gap – the narrow and superficial focus on the determinants and choice of adaptation actions by local people. The study locates this gap in the dominance of inward search approaches for explanations of adaptation action, choices and constraints as well as quantitative methods adopted by many of these studies. This study seeks to fill this gap by deploying qualitative methods as well as theories that allow the capture of contextual factors and processes of constraints to adaptation particularly those pertaining to how households make and implement adaptation decisions. It takes on the role and practices of external

actors such as government, non-governmental organisations and private companies as drivers of contextual vulnerability. It seeks to establish, not how households' characteristics determine choice of adaptation but how the choices that households make are structured by the situation they are in.

2.3 Theories of capacity and choice

This section explores theories of capacity and choice in order to link adaptation with contextual vulnerability and households' livelihoods. Sen's 'capability approach' provides a base to analysing how the life of households is affected by one form of climate risk - drought. Further insights are gained from Giddens' structuration theory and new institutionalism to account for constraints, choice and power relations inherent in choosing adaptation practices to support livelihoods in the context of impacts of drought. In the following section, these theories are explored and relevant elements used to formulate the conceptual framework of the study.

2.3.1 The capability approach

The capability approach is a broad normative framework for evaluation of individual well-being, social arrangements and design of policies and proposals about social change in society. It was originally conceived in the 1980s by Amartya Sen as an approach to welfare economics. Over the time, Sen, together with others such as political philosopher Martha Nussbaum, development economist Sudhir Anand and economic theorist James Foster have expounded this conceptual framework for assessment of human well-being for application in policy debates on human development. The discussion presented here mainly draws from Sen's works spanning over two decades, particularly because his approach is broader and more general, hence easy to accustom it to diverse cases of application.

The core characteristic of the capability approach is its focus on what people are effectively able to do and to be, rather than how much income or other primary social goods they have. This contrasts with philosophical approaches that concentrate on people's happiness or desire-fulfilment, or on theoretical and practical approaches that concentrate on income, expenditures, consumption or basic needs fulfilment. Robeyns, who has extensively reviewed the capability approach, notes that this focus on people's capabilities is critical – for instance in the choice of development policies, it makes a profound theoretical difference, and leads to quite different policies compared to neo-liberalism and utilitarian policy prescriptions (2005:3). Sen argues that in social evaluations and policy design, the focus should be on what people are able to do and be, on the quality of their life, and on removing obstacles in their lives so that

they have more freedom to live the kind of life which, upon reflection, they find valuable (Sen 1993:30).

The capability approach embraces five core concepts. The first is functionings. Sen regards these as 'the various things a person may value being and doing' (1999: 75). They are the states and activities constitutive of a person's being (Sen 1985a:10). Examples may include: being healthy, being educated, being safe from wars, having a satisfying job, being part of a social network, having self-respect, being happy; doings – participating in a social network, mobility, accessing markets.

The second concept is capabilities. A person's capabilities 'represents the various combinations of functionings (beings and doings) that the person can achieve' (Sen 1992: 40). Capabilities reflect a person's freedom or real opportunities regarding the kind of life he or she desires to lead. People's well-being is therefore seen in terms of their capabilities to function i.e. their effective opportunities to undertake the actions and activities that they want to engage and be whom they want to be. Robeyns (2003:544) observes that the difference between capability and functioning is between an opportunity to achieve and the actual achievement, between potential and outcome.

For Sen, it is not so much the achieved functionings that matter, as the real opportunities (freedoms) that one has to achieve those functionings. Thus, the notion of capabilities is essentially one of freedoms – the range of options a person has in deciding what kind of life to lead' (Dreze and Sen 1995:11). Once they effectively have these freedoms, they can choose to act on those freedoms in line with their own ideas of the kind of life they want to live. In policy analysis, the capability approach evaluates policies according to their impacts on people's capabilities. For instance, in food security analysis, the approach would ask whether people are food secure, and whether the conditions necessary for this capability are available. Such conditions may comprise access to financial resources, quality education, real political participation, security from armed conflicts, public goods etc.

Another concept of the capability approach is agency. Sen defines agency through agent, thus, an agent is 'someone who acts and brings about change and whose achievements are to be judged in terms of her own values and objectives (Sen 1999: 19). Agency is therefore one's ability to choose and pursue goals that one values and that are important for the life an individual wishes to lead. Limited agency or a constrained agency equates to disadvantage if an individual faces barriers to genuine choice (Robeyns 2003). Agency is thus crucial in the as-

sessment of one's capabilities, allowing for an examination of whether or not economic, social and/or political barriers impede a person's ability to pursue substantive freedoms. In the illustration in figure 4 below, socio-economic and/or political factors act as a sieve that checks a person's agency to access capabilities.

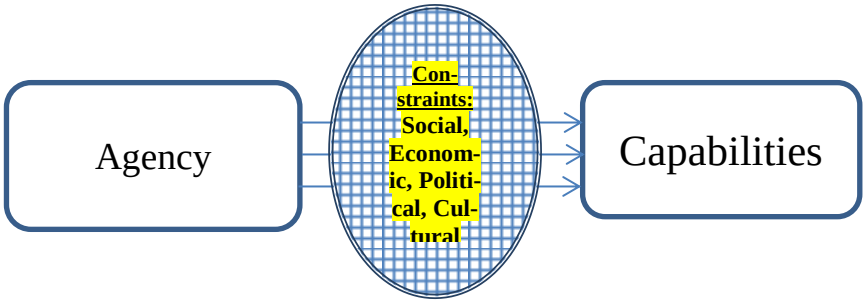


Figure 4: Linking agency with capabilities

The fourth and fifth concepts are opportunity freedom and process freedom. Sen (2002:585) regards opportunity freedom as what people have opportunity or ability to achieve, and process freedom as the process through which things happen. While capability is closely related to opportunity freedom; agency relates to personal process freedoms. At the core of the notion of opportunity is the idea of choice. Given that capability as a broader concept comprising of a set of vectors of functionings, a person can select specific configurations of these functionings. This act of choosing specific combinations endows a person with the freedom to lead one type of life or another (Sen 1992:40). But Sen is cautious not to fall into the fallacy of economic theory to assume that people choose what maximises their utility. He points out that the motivations behind choice may or may not coincide with the pursuit of self-interest. He reiterates that choices of achieved functionings are not idealised choices of a pure rational agent who is detached from society – choices are also mediated by preference formation mechanisms (1999:3).

The capacity aspect of opportunity and agency – the ability to choose, lend themselves to the notion of constraints. Sen defines constraints as factors that restrict the achievement of capabilities. Constraints are understood in the context of linkage between commodities (goods, services or facilities) and freedom (Sen 1985a). Commodities are means to achieving well-being. Commodities and freedom are connected by conversion factors. The conversion factors make it possible for commodities to be converted into functionings since the mere availability of commodities does not automatically guarantee functionings. Sen (1992:19-21, 26-30, 37-

38) recognises three conversion factors that inhibit or encourage the transformation of commodities into functionings. These are:

a) personal characteristics,
b) social characteristics, and
c) environmental characteristics.

Personal characteristics comprise those characteristics that a person is endowed with and which affect his bodily operation as well as his psychological make-up and operation. These may include intelligence, physical handicap, metabolism etc. Social characteristics include social norms, public policies, practices that unfairly discriminate, societal hierarchies, or power relations. The third conversion factor comprises the physical or built environment in which a person lives. Aspects of one's geographical location may include settlements in regions prone to droughts, floods or landslides. Among aspects of built environment are public goods such as water supply, energy infrastructure, bridges, and means of transportation and communication. The absence of electricity for instance can restrict people from adding value to their crop harvest through processing and packaging; or may make it too expensive to operate water pumps that have to be run on diesel as an alternative.

A set of commodities is therefore not an indicator of freedom without the consideration of quality of conversion factors. Consequently, constraints are embedded within the conversion factors. Constraints determine the selection of functionings. Constraints that limit the achievement of an individual's level of welfare are contingent upon the factors that constrain agency. They can be self-imposed or externally imposed in guiding how one chooses to be. Social and environmental conversion factors comprise the externally imposed constraints. For this study, the second and third categories of conversion factors of constraint are of interest. Figure 5 below illustrates the linkages between the elements of the capability approach.

Capability approach is used in scholarship and policy making in a wide range of fields, mostly in development studies and policy-making, welfare economics, social policy, and social and political philosophy. In its application, the approach can be interpreted in a narrow and broad sense (Crocker and Robeyns 2009). In the narrow way, the approach is used mainly for identifying capability and functionings as the primary information space for certain exercises. In the broad sense, the approach is used to go beyond the information space to capture principles such as equity, sustainability or responsibility.

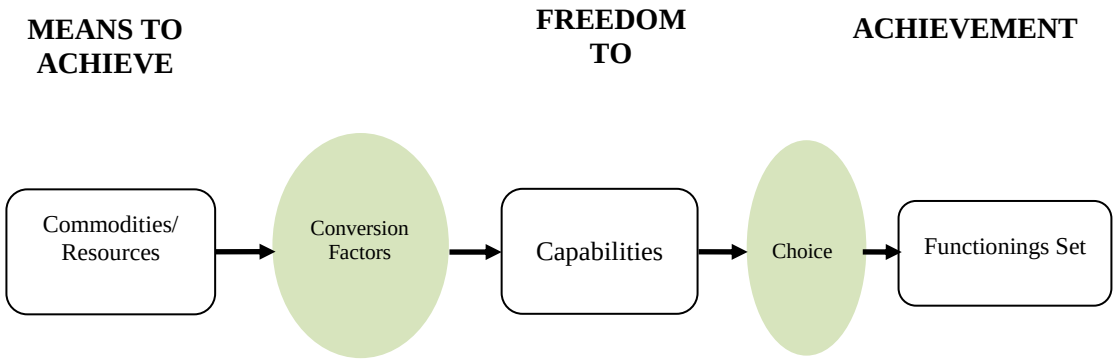


Figure 5: The capability approach

Sen's capability approach finds relevance in this work mainly due to its ability to provide a framework for assessing the perception of element of well-being valuable to people that are affected by climate risks, the alternative capabilities that households harness to achieve their threatened well-being as well as the constraints experienced in the process of making choices or operationalising the alternative capabilities.

The approach is used in the broader sense in that the qualities of agency of households to choose and achieve capabilities are linked to structure. The capability approach however does not provide much guidance in how the impacts of structure on agency come into being and are reproduced in society. This gap is filled through the notion of power provided by Giddens in the structuration theory.

2.3.2 Structuration theory

Structuration theory by Giddens (1984) is a social theory based on the analysis of structure and agents without giving primary to either. Its core thesis is that structure is both the medium and outcome of action. Social actions create structures, and it is through social actions that structures are produced and reproduced (Giddens 1984:22). The theory's focus is on understanding human agency and the social world (1984:p.xviii). Giddens hence, talks about 'the duality of structure' (p.xxi) to suggest that structures make social action possible, and at the same time that social action creates those very structures (figure 6 below sketches this relationship between structure and agency). Giddens contends that structures constrain and determine certain forms of behaviour, but they also enable behaviour: they provide opportunities as well as limitations. Furthermore, the structural circumstances within which human action or 'agency' take place are thereby reproduced, or redefined, by this action. Hence, according to Giddens,

"The rules and resources drawn upon in the production and reproduction of social action are at the same time the means of system reproduction. The constitution of agents and structures are not two independently given sets of phenomena, a dualism, but represent a duality" (pp. 19, 25).

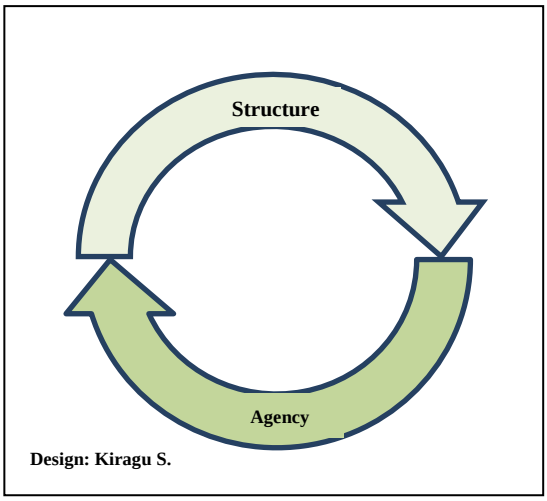


Figure 6: Giddens agency and structure model

This study benefits from Giddens' structuration theory by harnessing tenets pertaining to how structures constrain and determine forms of behaviour as well as how structural circumstances are reproduced. The concepts of 'rules' and 'resources' and power relations are particularly relevant in explaining how households choose and operationalise adaptation practices. These two sets of concepts are the focus of further elaboration below.

Giddens defines his concepts of structure and practices in terms of 'rules' and 'resources' (pxxxi). Rules provide the basis for an ordered and stable social life, i.e. they guide behaviour. They are the "generalisable procedures applied in the enactment/reproduction of social life" (p.7). They operate at two levels of consciousness: first a discursive level in which agents have a tacit or theoretical grasp of the rules involved in the reproduction of social practices thus enabling them to understand and give reasons for action: and second, on a practical level, an awareness of the skills and knowledge which enables agents to carry out forms of action.

Resources are "the media whereby transformative capacity is employed as power in the routine course of social interaction" (p.x). They are those elements which agents incorporate into the production and reproduction of social practices such as education, knowledge and skills which enable people to interact with others and transform relations. They serve as a source of power. Two types of resources are identified – allocative resources and authoritative resources. Allocative resources constitute power over things and are the material features of the environment, means of material production/reproduction and produced goods. Authoritative

resources denote power over people. They are those capacities involved in establishing control or dominion over actors.

Giddens sees all social action as involving power relationships (1984:14-15; 282). He views power as the means of getting things done and, as such, directly implied in human action. He sees power as the ability to make a difference, to change things from what they otherwise would have been, or as he puts it ‘transformative capacity’. For him, the idea of human agency involves the idea of transformative capacity, and this capacity of power may be used to change things, or the actions of other people. It can therefore be used to exercise power over other people and reduce their freedom. At the same time, though, power also increases the freedom of action of the agents who possess it. What restricts one person enables another to do more. Hence, according to Giddens,

> To be able to 'act otherwise' means being able to intervene in the world, or to refrain from such intervention, with the effect of influencing a specific process or state of affairs. This presumes that to be an agent is to be able to deploy (chronically, in the flow of daily life) a range of causal powers, including that of influencing those deployed by others. Action depends upon the capability of the individual to 'make a difference' to a pre-existing state of affairs or course of events (1984: P.14).

Giddens takes cognisance of power struggles (p282) which he regards as having to do with efforts to subdivide resources, which yield modalities of control in social systems. By 'control', he means the capability that some actors, groups or types of actors have of influencing the circumstances of action of others.

He agrees to the extent that power can be expressed as the capability of actors to enact decisions, which they favour on the one hand, and the 'mobilization of bias' that is built into institutions on the other but argues that this is not a satisfactory expression of power. Instead, he recommends conception of power within the duality through resources. This way, power is not perceived as a resource per se but rests upon allocative and authoritative resources (1984:258).

For Giddens, the concepts of ‘agent’ and ‘agency’ involve actors having the ability to transform the world around them through their actions, as well as being able to reproduce it. That does not mean that agents necessarily transform society, or for that matter reproduce it in ways that they intend. Human actions may well have consequences that were not anticipated by the agents involved. This, he argues, is because human knowledgeability is bounded. He therefore notes that the flow of action continually produces consequences which are unintended by actors. But he also acknowledged that in many contexts of social life, selective infor-

mation filtering can occur, whereby strategically placed actors seek reflectively to regulate the overall conditions of system reproduction either to keep things as they are or to change them (27-28).

Giddens structuration theory makes it possible to understand how structures make particular action of households possible and not others. The theory enables identification of rules and resources deployed in the production and reproduction of adaptation practices, which set the choice and quality of households' adaptation capabilities. The rules and resources of structure also help to trace how households internalise and routinise action.

The capability approach and structuration theory though providing a theory of choice and institutions are not elaborate enough in linking the two. This linked is better captured by perspectives from new institutionalism.

2.3.3 New institutionalism

The perspectives from new institutionalism are closely linked to Giddens and Sen's notions of choice or options available to actors in a given space. According to new institutionalism, choice is embedded in institutions. As Tang (2011:58) puts it, institutions enable as well as constrain choices. The theory emphasises relative autonomy and importance of social institutions while giving attention to the attempts made by individuals and groups to shift their advantage.

New institutional theory comes close to structuration theory by offering a balanced account based on earlier dichotomies espoused by structure and agency perspectives of explaining human behaviour. Accordingly, it postulates that it would be misleading to analyse an individual's behaviour without also taking cognisance of the complex social, historical and economic context within which they make choices, or to take an excessively structuralist view and assume that individual choices are simply determined by the structure.

Hall and Taylor (2006) provide three main variants of new institutionalism– rational choice, historical and sociological institutionalism. Rational choice institutionalists argue that individuals and their strategic calculations ought to be the central concert of social science. This school of thought leans towards political science and economics. A key element of this thought as championed by North (1990) is that institutions are created by utility-maximising individuals with clear intentions, hence a calculus approach.

The rational choice perspective is however critiqued by Steinmo (2008) who considers it to bracket preference formation from the analysis, contending that preferences are shaped by institutions. Steinmo instead advances historical institutionalism, a perspective borrowed from notions of bounded rationality - the idea that in decision-making, rationality of individuals is limited by the information they have, the cognitive limitations of their minds, and the finite amount of time they have to make a decision (Simon 1972). Here institutions are regarded as formal rules and operating strategies, including informal institutions and informal interaction (Hall and Taylor, 2006). Accounts focus on the effects of institutions over time, the ways in which a particular set of institutions, once established, can influence the behaviour of the actors who established them (*Ibid*).

Steinmo, while not denying that individuals attempt to calculate their interests, argues that outcomes are the product of the interactions among various groups, interests, ideas, and institutional structures. Thus, preferences are formed by the institutional context within which they emerge and ought not to be treated as fixed. From the historical institutionalism, institutions play a determinant role since they shape the actions of actors. Steinmo also recognizes the way in which existing structures become self-perpetuating and mutually reinforcing, such that practices that are not collectively optimal persist over time. Hall and Taylor observe that strategies induced by a given institutional setting may over time, become fixed into worldviews, which are propagated by formal organisations and ultimately shape even the self-images and basic preferences of the actors involved in them (1996:940).

Historical institutionalism is closely associated with historical development, propagating social causation that is "path dependent". Path dependency implies that present decisions depend on former ones or events made in history – thus the same operative forces will be mediated by the contextual features of a given situation often inherited from the past (Pierson 2000). Hence, past lines of policy have a high potential of conditioning subsequent policy choices.

The third variant of new institutionalism is sociological institutionalism, which defines institutions broadly to include informal norms and conventions, such as symbol systems, cognitive scripts and moral templates that provide the „frames of meaning" for guiding human action, as well as formal rules, procedures and norms (Hall and Taylor; 2006:947). This perspective shows that individual decisions are a produce not only of institutional setting but also of a much larger frame of reference. Individuals find themselves "embedded" in cultural and or-

ganisational fields or sectors, which determine the very concept of "self-interest" and "utility" (Koelble 1995:232). Hence, what an individual will see as rational action is itself socially constituted. As observed by Powell (1991) most people are inherently conservative – once they establish a routine, they tend to stick with it. Cognitive and cultural embedding explains why most individuals cannot conceive of alternative ways of "doing things" and prefer to stay with the tried and true. A political embeddedness can also be observed when individuals are viewed as embedded in so many social, economic and political relationships beyond their control and even cognition. Here social inter-relationships, power networks, and class are key constituents of decision-making.

Sociological institutionalism emphasises the highly interactive and mutually constitutive character of the relationship between institutions and individual action choice. In this scenario, action is tightly bound up with interpretation. This is based on the argument that when faced with a situation, the individual must find a way of recognizing it as well as of responding to it. The scripts or templates implicit in the institutional world provide the means for accomplishing both of these tasks, often more or less simultaneously. The relationship between the individual and the institution then is built on a kind of practical reasoning whereby the individual works with and reworks the available institutional templates to device a course of action.

This does not however discount an individual's rational choice. Instead, sociological institutionalism argues that what an individual will see as rational action is itself socially constituted. This view is similar to Ingram and Clay's pan-disciplinary theory (2000), that actors pursue their interests by making choices within institutional constraints - what they call "choice within constraints".

Historical institutionalism and sociological institutionalism provide relevant guidance in understanding how households make choices of adaptation practices. Historical institutionalism enables analysis of past trends in governmental policies and practices, to root the perceptions and choices of adaptation practices of households. Socialogical institutionalism on the other hand helps to link the role of cultural institutions of the Kamba people of Mwingi to individual household adaptation practices.

2.4 Conceptual framework and research questions

The above theories provide a suitable foundation for building the conceptual approach of this study that constructs the relationship between household adaptation and contextual vulnerabil-

ity through the concept of capability. The notions of commodities, constraint, structure, capability, agency, choice and power constitute the nodes of adaptation-vulnerability relationship thereby providing a map for evaluating choices and effectiveness of household adaptation practices.

Based on the insights of the capability approach, adaptation can be regarded as a capability set of actions and processes that enhance households' ability to achieve its well-being. The goal of adaptation can therefore be conceptualised as that of expansion of the adaptation capability set.

A household requires commodities as means for generating a set of capabilities relevant to achieving desired functionings – a set of well-being. Capabilities are the configurations available for a household to choose from in order to attain a functioning. The quality and quantity of the capabilities is determined by the efficiency of conversion factors through which commodities are transformed into capabilities available for achievement of functionings. When the conversion factors restrict the translation of commodities into a set of capabilities, they become constraints.

Contextual vulnerability represents these constraints and is depicted by the social and environmental conversion factors, which encompass social, economic, cultural and political elements influencing a household's ability to access and use resources/commodities to achieve desired capabilities. They are manifested through institutions, (rules and resources) and power inherent in (Giddens') structure. The environmental conversion factors considered in this work are those of built environment, those in the realm of the politics of public resource allocation such as public goods. These constraints of structure operate by placing barriers upon the range of options open to a household. Households' choice or decision-making pool consequently depends on, on one hand, the capabilities and on the other hand the conversion factors which contribute to preference formation.

The practices of external actors such as governmental and non-governmental organisations constitute part of the structure and contribute to the condition of the quality of conversion factors that constitute the circumstances of households as well as directly influence the choices that households consequently make. This is achieved through employment of control of authoritative and allocative resources to influence the circumstances of action of households. That the well-being of drylands communities is frequently negatively affected by climate risks is an indication that these vulnerability factors are continuously reproduced in society.

A key assumption in this study is that households have a weak set of adaptation capabilities which consequently limits the range and quality of functionings (beings e.g. being able to produce food or being able to access water) they can achieve in the face of climate risks. A keen scrutiny of the relationship between the structure and conversion factors can reveal why the conditions of constraints persist. The three perspectives are integrated into the conceptual framework summarised by the illustration in figure 7 below. Based on this conceptual framework, the research questions are formulated as follows:

Key question: How can adaptation by households in the face of climate risks be understood?

Specific questions:

i. What household functioning (doings, beings that make life valuable) are impacted by climate risks?
ii. What (alternative combinations of) capabilities do households seek, to achieve these functionings?
i. What factors constrain ability of households to expand adaptation capabilities?
ii. How are households' preferences in making choice from the adaptation capabilities formed?
iii. How are constraints to adaptation capabilities reproduced?

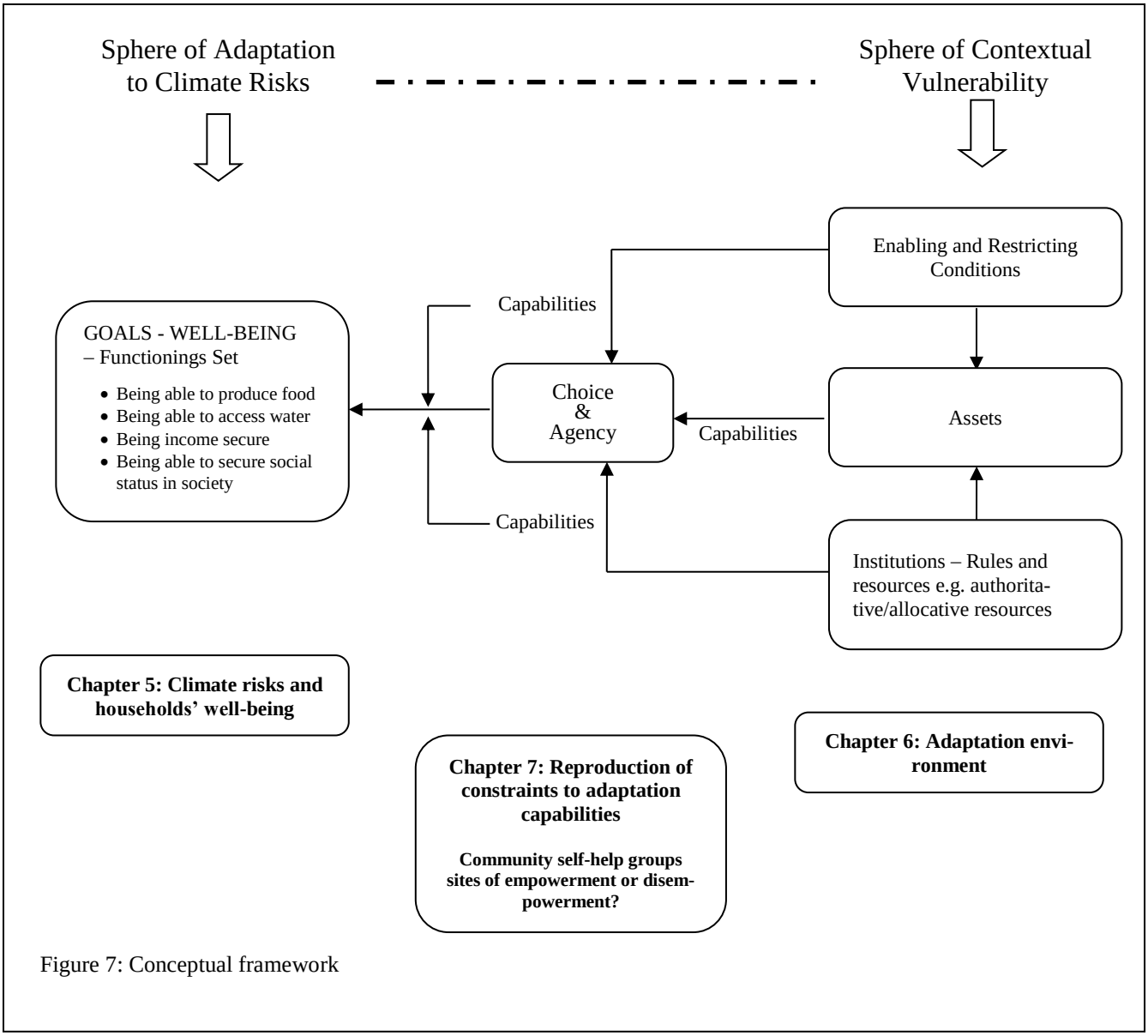


Figure 7: Conceptual framework

2.5 Summary

This chapter introduced the key concepts of the study, reviewed empirical studies and presented the theoretical and conceptual framework. In its first part, on key concepts to the study – adaptation and vulnerability, the chapter aimed to scale down the operational definition of the concepts by sieving through the maze usage of the adaptation term by a variety of disciplines. Adaptation by households was defined as actions and processes that enhance the ability of households to uphold their well-being in the face of climate risks. Vulnerability on the other hand was conceptualised through social processes that catalyse the climate-people (nature-society) interactions. The success of such actions and processes was therefore regarded as embedded in the social processes defining vulnerability.

In its second part, the aim was to review empirical studies on adaptation. It was established that many of the studies limited themselves to a focus on climate stimuli as their starting point thereby problematising adaptation in a narrow way. Where they reached out to factors determining success of adaptation, they were inward-looking – at household characteristics such as age, income and size of farm, steering away from the sensitive arena of social processes involving governance, equity and justice in resources allocation and decision-making. The knowledge gap was therefore teased out as the limited focus on explanations of household adaptation actions, choices and constraints from social processes embedded in social structures.

In the last part, the chapter focused on theorising capacity and choice. Tenets from capability approach by Amartya Sen, Anthony Giddens' structuration theory as well as insights from new institutionalism were synthesised to support formulation of a conceptual framework and research questions. Having grounded the study in theoretical foundations and formulated the research questions, the next chapter introduces the study area, Mwingi in Kenya and its link to its wider drylands context.

CHAPTER THREE

MWINGI

CONTEXTUALISING COMMUNITIES IN KENYA'S DRYLANDS

3.0 Introduction

This chapter introduces the study area and its wider context. The objective of the chapter is to ground the study not only within the sampled dryland region of Mwingi but anchor it within the wider scope of issues pertaining to drylands of Kenya in general. The chapter is presented in two parts. The first part discusses the biophysical as well as the social aspects relating to Mwingi. In the second part, emphasis is placed on the socio-political settings that have backgrounded the contemporary challenges facing dryland communities in Kenya. In the chapter conclusion, pertinent vulnerability elements relating to the research question of how household adaptation in the face of climate risks can be understood are teased out.

3.1 Mwingi - the study area

3.1.1 Location and administration

Mwingi region is located in Kenya's Kitui County[14] (part of the formally Eastern Province), and is part of *Ukambani*[15], an area predominantly occupied by the Kamba ethnic community. It comprises six districts namely: Mwingi Central, Mwingi East, Mwingi West (Migwani), Kyuso, Mumoni and Tseikuru. Before 2007, Mwingi region was a district and comprised nine divisions - Central, Migwani, Kyuso, Mumoni, Nguni, Ngomeni, Nuu, Mui and Tseikuru. Until 2009, most of documentations on Mwingi are based on these divisions while before 1992, Mwingi was referenced as a division of the then Kitui District. At the time of the commencement of this study, there was still confusion on boundaries, headquarters and staff of newly created districts. The study therefore opted to use the term Mwingi region to refer to the overall area before it was sub-divided. In so doing, the newly created administrative districts are included without jeopardising relevance and accuracy of clustered information documented before the split of the District. Many post-2007 documents reporting on activities

[14] The concept of county as a geopolitical entity is a new entrant into the governance of Kenya. Before August 2010, the country was governed through 8 main administrative regions referred to as provinces. With the promulgation of a new constitution, governance was devolved and restructured to feature 47 semi-autonomous regions referred to as counties. Kitui County is one of the 47 and comprises of Mwingi, Kitui and Mutomo regions with each region comprising of numerous districts. *Ukambani*, predominantly inhabited by the Kamba ethnic community has three counties – Kitui, Machakos and Makueni.

[15] *Ukambani* is a term used to refer to region traditionally occupied by the Kikamba speaking community.

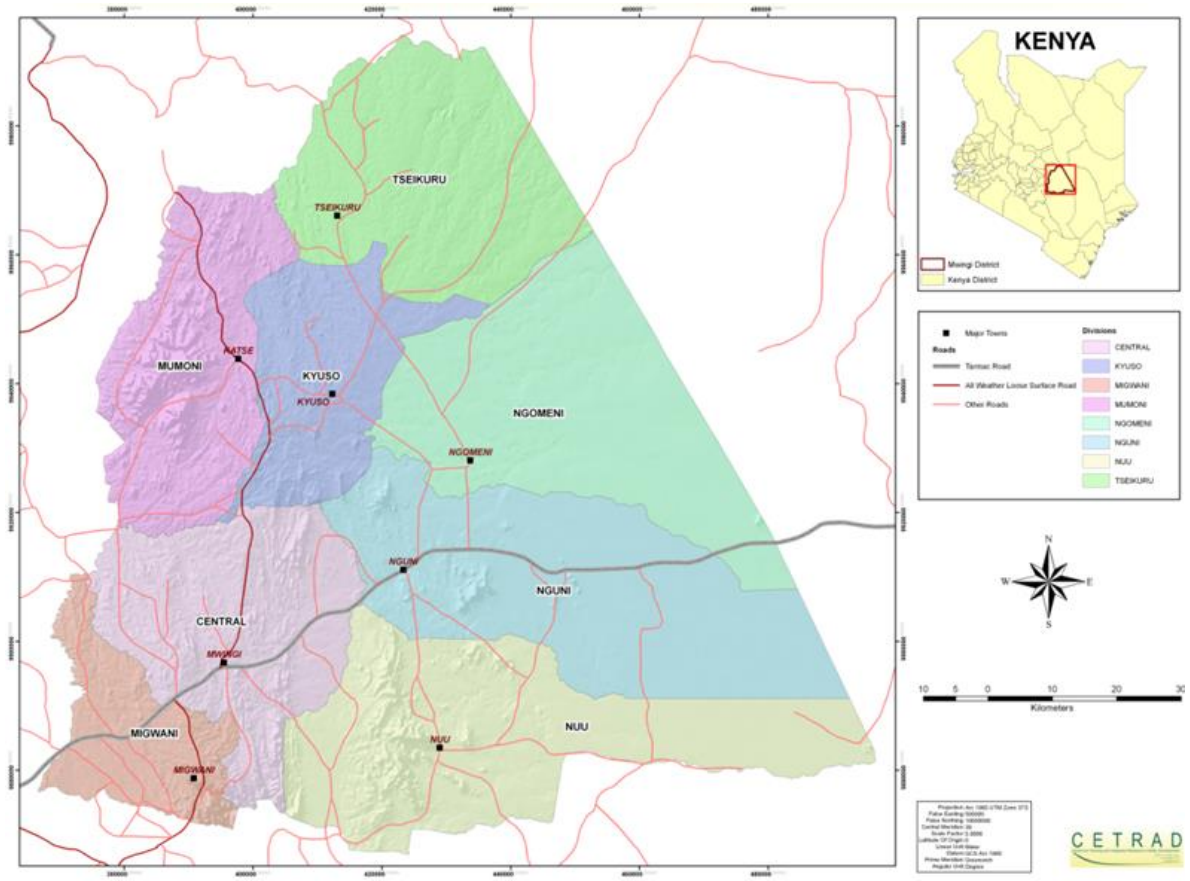
that were planned before the splits refer to "larger Mwingi" to also mean the previous district boundaries. Therefore Mwingi region and larger Mwingi are synonymous.

Mwingi region lies between latitude $0^0 03'$ and $1^0 12'$ and longitudes $37^0 47'$ $38^0 57'$ degrees and covers an area of 10,030.30 km^2. It borders Kitui District to the south, Machakos District to the west, Mbeere and Meru South Districts to the north and Tana River District to the north- east. On the lower side towards Tana River district, it neighbours the Kora National Reserve. It also hosts the Mwingi National Reserve to the east. Mwingi town, which is the main entry into the area, is approximately 230 km east of Nairobi, located on the A3 Thika-Garissa road.

Each of the six districts comprising Mwingi region is governed by a District Commissioner (DC). Partitioning and governance of administrative areas below a district comprise: divisions – headed by a District Officer; locations – headed by a Chief, sub-locations – headed by an Assistant Chief, and villages represented by a village elder. While all the positions are held by government-salaried staff, the village elder is normally a non-salaried appointed volunteer. These levels of governance and organisation form the medium through which rules, regulations and general information are communicated – from the central government to the to the province, then to the district, division, location and sub-location and village; and vice versa. The study area map 1 below presents the location of Mwingi and its main administrative centres.

Politically, the region has two constituencies – Mwingi North and Mwingi South. Mwingi South is represented by the same Member of Parliament since 1998. Before joining elective politics, the representative had among other positions, worked in the provincial administration as District Commissioner from 1974-1978 and as a Provincial Commissioner from 1979-1985. Mwingi North was until early 2013 represented by the Vice President[16] of Kenya, who has represented the region since 1985 (when the constituency was known as Kitui North). In 2010, he celebrated silver jubilee of 25 years in political leadership, a fete that received mixed reactions from within and outside of Mwingi. Some residents questioned his legacy for representing his people given that among other observations, his constituency perpetually relies on relief food and faces challenges of access to water, health care and education abound – elements central to contextual vulnerability.

[16] Honorable Kalonzo Musyoka served as Kenya's vice president from January 2008 to early March 2013.



Map 1. Study area

3.1.2 Bio-physical characteristics

i. Temperatures and precipitation

The climate of Mwingi is hot and dry for the greater part of the year. The maximum and minimum mean annual temperatures range between 26ºC and 34ºC and 14ºC and 22ºC respectively. Average annual temperature is 24º C. The region has bimodal rainfall: March-May (long rains) and October-December (short rains). Rainfall ranges between 400mm and 800mm per year but is erratic. The short October-December rainfall is regarded as more reliable for agricultural production compared to the long March-May rainfall (Shisanya 2011).

Based on Sombroek *et al*. (1982) agro-climatic zones (ACZ), Mwingi falls under agro-climatic zone V, described as semi-arid with moisture index of 25-40%. This classification[17] expresses land suitability for agriculture and is based on the relationship between annual rainfall and potential evapo-transpiration as well as the year-to-year variation in rainfall. Due to the relationship between rainfall and agricultural productivity, Mwingi is also described under sub-categories – mixed farming, marginal mixed farming and marginal zones. Mixed farming zones are found in Mwingi Central and Mwingi West, part of Mumoni and part of Nuu. The

[17] Under this Agro-climatic classification, Kenya is divided into 7 zones: I-humid, II-sub-humid, III-semi-humid, IV-semi-humid to semi-arid, V-semi-arid, VI-arid, and VII-very arid.

predominant livelihood activity in this zone is cultivation. Marginal zones comprise Ngomeni, Tseukuru, Nguni, part of Kyuso, part of Nuu and part of Mumoni. The main livelihood activity in this zone is livestock keeping. The transitional zone between the two is the mixed marginal zone and livelihood production activity is a mix of cultivation and livestock rearing.

Year to year and season to season rainfall variability is evident in Mwingi. This variability is linked to the El-Niño-Southern Oscillation (ENSO) phenomena (Arthur et *al*. 2002). A recent review of rainfall data from five regions of *Ukambani* (Kitui, Mwingi, Mutomo, Machakos and Makueni) for its variability over decadal timescales for the period 1957-2007 showed no discernible increasing or decreasing trend either in the annual or seasonal rainfall. Rainfall showed mostly positive anomalies during 1960s and negative anomalies during the 1970s. After the 1970s, the fluctuations in rainfall were observed to be dominated by short period cycles of about five years duration that normally coincide with the swings in the El Niño/La Niña-Southern Oscillation (Rao *et al*. 2011). Indeed, droughts, particularly meteorological droughts[18] and agricultural droughts[19] are frequent in Mwingi. Examples of recent severe droughts are the 1983/4, 1991/92, 1996/97, 1999/2000, 2003/2004, 2005/2006, 2008/2009 and 2011 droughts. The agricultural drought is more conspicuously discoursed due to its immediate impacts on rain-fed agriculture.

Figure 8 below provides a graphical presentation of the long- and short-rains anomalies while figure 9 illustrates drought scenarios over a period of ten years: 2001-2010.

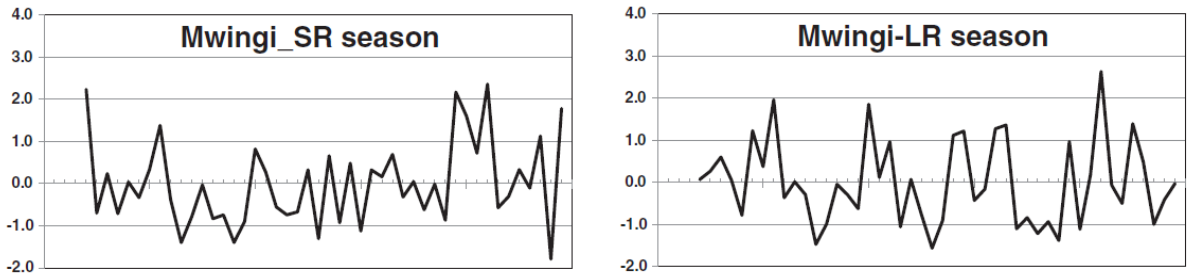


Figure 8: Standardized short rains (SR)/long rains (LR) seasonal rainfall anomalies: 1961-2006
Source: Rao et al. 2011

[18] Meteorological drought is defined on the basis of the degree of dryness, often in comparison to some normal or average amount, and the duration of the dry period (Wilhite and Glantz 1985).

[19] Agricultural droughts relate to factors such as differences between actual and potential evapo-transpiration and soil-water deficits; are crop-specific and depend heavily on the timing of rain and dry periods relative to crop-cycles. Agricultural droughts can occur in the absence of meteorological drought, and vice versa (Wilhite and Glantz 1985).

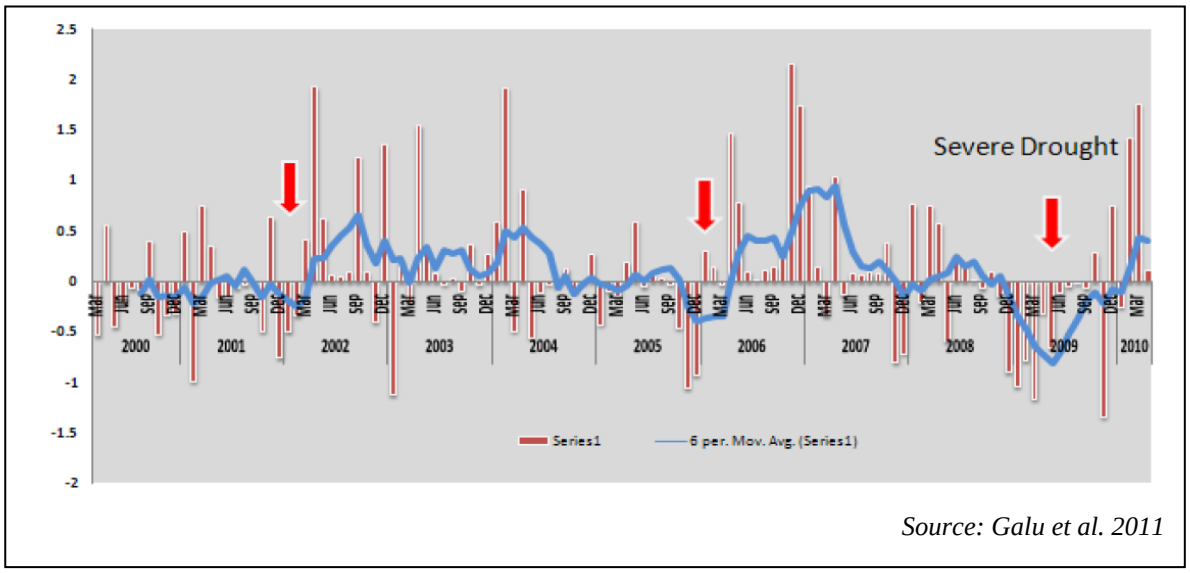


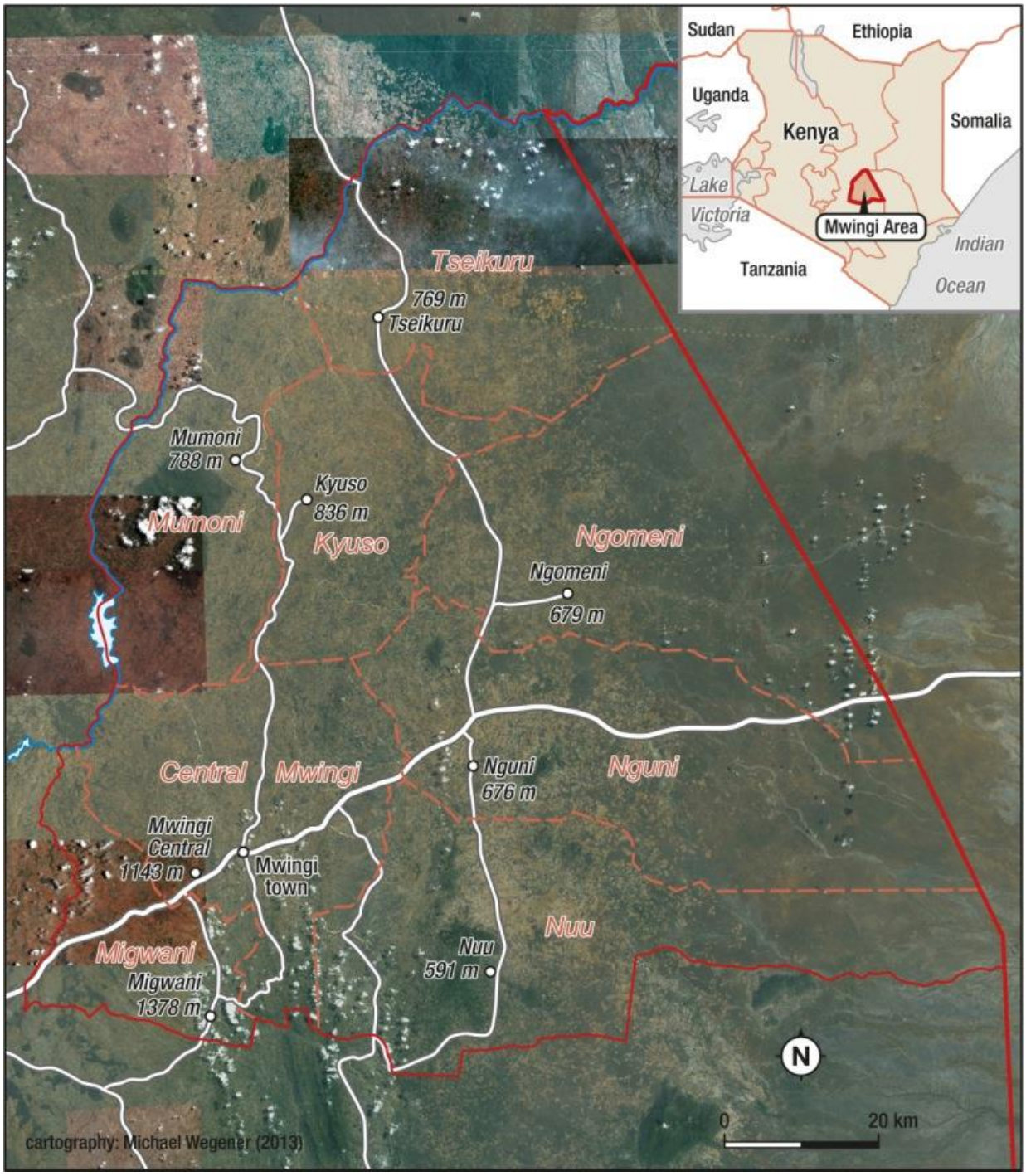
Figure 9: Monthly precipitation index/drought trends for Mwingi: 2001-2010

ii. **Topography**

Mwingi topography is undulating, giving way to plains towards the east with a few inselbergs in Mumoni, Nuu and Migwani areas. The landscape is generally flat, with a plain that gently rolls down towards the east and northeast where altitudes are as low as 400m (see satellite map 2 below). The highest point is Mumoni Hill, with an altitude of 1,747metres above sea level. The highlands, namely Migwani, Mumoni, Central and Mui receive relatively more rainfall compared to the lowland areas of Nguni, Kyuso and Tseikuru. Consequently, droughts are normally more severe on the lowlands than on the relatively higher zones.

iii. Soils

According to a detailed description provided by Jaetzold *et al.* (2006:503-506), the soils of Mwingi occur in wide zones running north/south, as determined by parent materials and climate, with the southern parts being progressively drier to the east and the soils more sandy. The soils of the hills are usually shallow and stony. On the associated foothills, the soils are of moderately low to high fertility. The uplands in the western part of the region also carry soils characterized by an increase of clay with depth and low fertility. To the east they are associated with soils forming a red sand plain. They are of low fertility and cannot rain-fed agriculture. Along water channels on flat river basins, soils are alluvial and of moderate to high fertility. Most of the soils in the plains are of low to moderately low fertility and show a sodic/salinity hazard, especially in the bottomlands. In some parts, the soils are difficult to plough when dry hence some farmers prefer to plough their lands immediately after the onset of rains.



Map 2: A satellite image of Mwingi region

Although systematic documentation of the magnitude of soil erosion and environmental degradation is scanty, these remain at the centre of agricultural production and food security discourses and on-the-ground activities with farmers as they are linked to reduced soil fertility and subsequent low agricultural production.

After a hot dry season, the scorched earth is highly susceptible to erosion as the erratic flash rains wash away the loose top soil carrying away its fertility to river valleys. Due to reduced fertility and nature of the soils, regeneration of natural vegetation is slow while agricultural productivity without additional nutrient inputs is low. Some literature embraces a Malthusian perspective and point to population increase and overgrazing as part of the cause of soil and land degradation in the region (e.g. Muchena 2008). Clearing of natural vegetation particularly cutting down of trees for charcoal production is rampant during the drought periods as households struggle to meet their cash needs. Such clearing without replacement is also presumed to increase in the rate of land degradation. Land degradation and corresponding soil conservation initiatives thus have a long history in the region as is manifested by the terraced landscapes in the hilly areas. Tree planting campaigns are driven by governmental and non-governmental organisations in a bid to encourage the local population to increase tree cover. The tree planting agenda is however not limited to Mwingi – it is country-wide and has a longer history (see more details in Chapter 6 section 6.2.2).

iv. Natural biodiversity

The natural vegetation of Mwingi is highly heterogeneous (Jaetzold *et al.* 2006). Uncultivated patches of land are occupied by bushlands, grasslands and shrub-lands, comprising various combinations of dryland vegetation. The predominant plant association is a mixture of *Acacia-commiphora* bushlands. Perennial grasses such as *Eragrostis superba Peyr., Cenchrus ciliaris L., Enteropogon macrostachyus, Benth-* and some *Pennisetum* species provide forage to grazing animals. There are three Government-protected zones in the region: two forest reserves[20]: Nuu–Imba in the south and the larger Mumoni Gaikuyu complex in the north, both managed by Kenya Forest Service (KFS); and Mwingi National Reserve[20], located to the north of Mwingi town and managed by the Kenya Wildlife Service (KWS). The reserves have hill-top dry forest patches at higher altitude, and dry woodland and riverine forest lower down. They host numerous plant and animal species.

[20] Forest/national reserves are portions of state land that are protected for their importance for wildlife, flora, fauna

The plant species are important sources of medicine, fibre, food, fodder or forage, timber and fuelwood. During dry and drought seasons, these hills are the target of sources of livestock pasture although entry is restricted. Similarly, they are targets for charcoal production to provide income when other sources become untenable. *Ukambani* in general is popular for lowlands honey production, a practice rooted in the hunter-gatherer life that involved placing log hives on trees near water sources (JAICAF[21] 2009). To-date, beekeeping is an important livelihood activity among local populations neighbouring forests and has been supported through the ministries of agriculture and livestock development. ICIPE[22], IFAD[23] and UNDP[24] from 1995 to 2006 worked in Mwingi on a commercial insects program[25] (CIP) that involved honey bee and silk worm management for income generation and biodiversity conservation.

3.1.3 Social aspects

i. **Demography**

Mwingi is a homogeneous region in terms of inhabitants. It comprises mainly of the Kamba[26] ethnic group with few Somali people along the lower border. Mwingi region had a population of 384,948 as per the 2009 population census compared to 303,828 in 1999 representing a growth rate of 2.6% (Republic of Kenya 2010). It has an average population density of 38 persons per kilometre. More than 95% of the population is rural-based while 5% is the urban population, of which, Mwingi town has 4% while the rest is distributed in other trading centres. The ratio of men to women is slightly imbalanced in favour of women, with approximate ratio of 47:53. A summary of Mwingi's population is tabulated in table 3 below.

Poverty levels in Mwingi are high. Over 58% of the population lives below the poverty line of less than US$1 a day as well as a high dependency ration of 1.46:1 (Republic of Kenya 2007). The major religion is Christianity with a few Muslim communities especially in the urban centres

[21] JAICAF - Japanese Association for International Collaboration of Agriculture and Forestry
[22] ICIPE – International Centre of Insect Physiology and Ecology
[23] IFAD – International Fund for Agriculture Development
[24] UNDP – United Nations Development Programme
[25] CIP report compiled by Raina, S.K., Kioko, E., Gordon, I. and Nyandiga, C. (2009) Improving forest conservation and community livelihoods through income generation from commercial insects in three Kenyan forests. icipe Science Press ISBN: 9290642084, pp. 87.
[26] The *Kamba* (also called the *Akamba*) is a Bantu ethnic group residing in the semi-arid eastern Kenya. *Kambas* make up about 11% of Kenya's total population. The *Kikuyu* are the largest ethnic group, making about 22% and occupy mainly the central parts of Kenya. The *Luhya* are the second largest and predominantly occupy western Kenya while the *Luo* are fourth and occupy the region around Lake Victoria.

Table 3: Population of Mwingi region by 2009

Mwingi Region	Total	Male	Female	Households	Area in sq km	Density
	384.948	**180.858**	**204.090**	**77.815**	**10.046**	**38**
Urban Population	18.048	8.953	9.095	5.872	9	3.070
Rural Population	366.900	171.905	194.995	71.943	10.037	37

Source: Republic of Kenya 2010

ii. Education

The level of literacy in Mwingi region is generally low, characterised by low rates of transition from primary school, through secondary and tertiary institutions of learning (see table 4 below). The Government is responsible for provision of education. The density of schools has been consistently low (approx. 1 primary school per 28km^2) with a high teacher/pupil ratio of 1:35 (Republic of Kenya 2005). Many primary and secondary schools lack basic infrastructure including classes despite a gradual increase in local population. The Constituency Development Fund[27], popularly known as CDF has since its inauguration in 2005, attempted to reverse the situation by supporting construction of additional classes and payment of bursaries for children from poor families. Numerous signboards denoting classes or dispensaries built from CDF funds mark the region. However, the increase in classes is not commensurate with the number of teachers since the posting of teachers is undertaken by a different government body – the Teacher Service Commission. Even though primary school and to some extent secondary school education is free, parents have the burden of paying for extra teachers who are employed under the Parent-Teachers-Association (PTA) arrangement. A few privately-owned primary schools, located mainly in the urban centres attempt to fill the gap. However, due to high fees, only parents with financial ability can access them.

Table 4: Highest education reached by Mwingi rural population aged 3 years and above

	Never attended School	Pre-Primary	Primary	Secondary	Tertiary	University	Youth Polytechnic	Basic Literacy	Madrassa	Total
Mwingi Region	69,559	19,701	201,931	27,254	4,957	1,213	3,842	737	86	329,280
Males	27,772	10,062	95,505	14,196	2,704	793	1,450	247	43	152,772
Females	41,787	9,639	106,426	13,058	2,253	420	2,392	490	43	176,508

Source: Republic of Kenya 2010

[27] *CDF* is a development fund that goes directly from central government to local areas and thus provides people at the grassroots the opportunity to make expenditure decisions that maximize their welfare. This is unlike other development funds that filter from the central government through larger and more layers of administrative organs and bureaucracies.

iii. Livelihoods agricultural production

The population in the study area relies heavily on cultivation and livestock keeping. Indeed, 75% of the households' food and income is generated from agriculture (Republic of Kenya 2007). Cultivation is more predominant in the higher altitude zones while livestock keeping is more common in the lower attitude zones. Diverse varieties of crops are planted, predominantly maize, millet, sorghum, green grams (mung bean) and cowpeas. Although food production serves subsistence purposes, some is sold to meet a household's cash needs. Livestock on the other hand, consists of mainly of cattle, goats, donkeys and chicken. While cattle and goats provide milk, meat, ox-plough labour, hides, and cash income, donkeys are solely kept for transport labour. Livestock also plays important social and cultural roles – as a symbol of wealth and exchange in marriage (Nyariki and Abeele 2004). Goats are normally sold for household needs that do not require large sums of money, while cattle are sold to meet larger expenses. Mwingi region has low potential rain-fed agriculture. The local population augments their agro-pastoralist income from the forest and woodland resources.

Like other parts of Kenya, land tenure is governed by customary as well as state laws. Under customary law, women's tenure of land is based on social relations between men and women, and more specifically husbands and wives, with few provisions for divorced women and even fewer for single women. Transition from customary to state laws of land tenure entails patriarchy attachment, since male heads of households more often than not constitute the exclusive locus of land holding in cases of individual tenure (Kameri-Mbote 2005).

iv. Migration and conflict

Due to challenges of meeting livelihood needs during the dry seasons, there is considerable migration of people from the rural areas to urban areas in search of waged labour. Mwingi town, Garissa, Nairobi and Mombasa are the common target towns of emigration. This results in high cases of absentee household heads, normally the males. Internal migration, within Mwingi, can also be observed. Some livestock keepers migrate with their livestock to other areas in search of pasture and water or temporarily send them to distantly located friends and relatives. Most go to the hilly Mumoni areas or to the basin of Tana River, where prospects for pasture and water are higher.

Mwingi is a transitional zone between the semi-humid neighbouring regions of Kitui and the arid Tana River district, making it a migration destination for expansion of farming land as well as access of water and pastures resources by pastoralists (see figure 10 below which sketches the migration patterns around Mwingi). For instance, the Somali and Oroma inhabit-

ing the arid Tana River District move into Mwingi which they regard as comparatively wetter and therefore with pasture and water. But once they cross the border into Mwingi, they are required to pay for access to water. As human and livestock traffic to reduced water points increases, skirmishes arise. Conflicts resulting even in deaths are frequent during the drought periods. Ukasi, Kasiluni and Ngomeni are normally the hotspots of conflicts as the Somali herders react to restricted movement and trespass accusations levelled on them by the agro-pastoral *Kambas*. Opiyo *et al.* (2011) note that some of the clashes result when the pastoralists perceive of having been cheated in the negotiation of grazing transactions. Table 5 summarises three cases of conflicts reported in the months of February and July 2011 and January 2012.

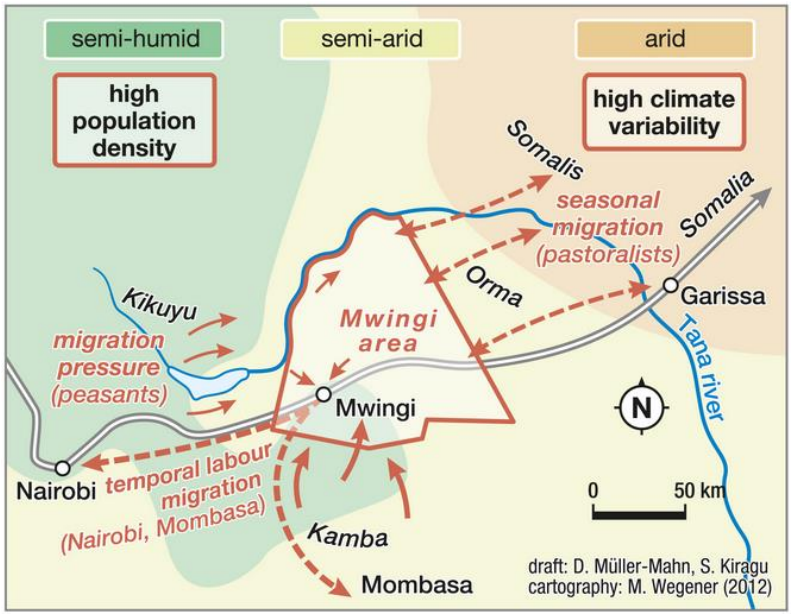


Figure 10: Migration patterns in Mwingi

Table 5: Media reports on conflicts

Date reported	Summary description of the nature of conflict
14 Jan 2012	Headline: *Bandits strike Kyuso shortly after Iteere Tour* Five armed bandits have raided Mandongoi village in Kyuso. They drove away with 60 heads of cattle and 51 goats. It was the second time in less than one week that the bandits from the neighbouring Tana River county had attached villages in the area. In the past weeks, attacks occurred in Kyenini, Wikithuki and Makuthanga villages where 5 people were killed. Two of the victims were shot while the others were hacked with machetes.
12 July 2011	Headline: *Tension in Tseikuru as pastoralists, farmers clash over dwindling resources* Approximately 2000 herders with their livestock, coming from Mbala Mbala, Garisa entered Kamuthanga village in Kaningo location in Tseikuru district in May 2011. Clashes that involve use of guns have resulted in closure of four schools, 4000 locals have been displaced, some people have been injured, women raped and houses touched
24 February 2011	Headline: *Mwingi DC averts clash over borehole water* Imminent clash over borehole water has been averted between Tana River herdsmen and residents of Ukasi. The encroaching herders had moved from 40km away where the Sosoma borehole that they have been sourcing water from broke down. The Ukasi borehole management committee declined to allow the Somali herders access to water dismissing them as outsiders. The Mwingi East DC averted the clash.

Source: The Star 2011; 2012

v. External interventions

With climatic conditions of the region fronted as the main casual factor of local community vulnerability and impoverishment (climate-based problematisation[28]), numerous external interventions are undertaken in Mwingi. These are normally implemented by government and non-government organisations under the labels of development[29], humanitarian aid[30] or climate projects[31]. Because of the role these external actors and their interventions play in the

[28] Climate variability particularly droughts in the accounting of the conceptual logic of the projects

[29] Development: The pursuit or attainment of well-being in all its dimensions, including economic sufficiency, social equity, personal security, good health, opportunity, and personal freedom (McGray H., Hammill A. and Bradley R. (2007) *Weathering the storm - options for framing adaptation and development*. World Resources Institute (WRI): Washington DC)

[30] 'Humanitarian aid' is aid and action designed to save lives, alleviate suffering and maintain and protect human dignity during and in the aftermath of emergencies. It is intended to be short-term in nature and provide for activities in the immediate aftermath of a disaster. Emergency response may include: Material relief assistance and services (shelter, water, medicines, seeds etc.), emergency food aid (short-term distribution and supplementary feeding programmes); relief coordination, protection and support services (coordination, logistics and communications); reconstruction and rehabilitation (repairing pre-existing infrastructure as opposed to longer-term activities designed to improve the level of infrastructure) and disaster prevention and preparedness (disaster risk reduction - DRR), early warning systems, contingency stocks and planning.

[31] Projects whose conceptual logic is based on the global climate change discourse – that due to human activity, the global climate change is changing; Africa is highly vulnerable due to its high dependence on climate-sensitive economies and presence of other stresses; therefore will suffer most from the negative impacts of climate change. Efforts are necessary to support countries and communities to adapt to current or predicted future climate change.

definition of community vulnerability to climate risk, this section provides some details on the background of these interventions.

Following the drought of 1992, to avert a looming famine, the then GTZ[32] in cooperation with the then Ministry of Agriculture and Rural Development, formulated and implemented the Integrated Food Security Programme-Eastern Kenya (IFSP-E). The project's goal was to improve food security. It comprised drought monitoring and emergency preparedness, health and nutrition, agriculture and animal husbandry as well as water supply infrastructure. Community-identified projects through participatory rural appraisal[33] (PRA) were supported through food-for-work[34] arrangement (FFW).

Parallel to this programme, responding to the same 1992 drought, the Kenya Government with World Bank funding formulated an intervention – Emergency Drought Recovery Project – Eastern Province (EDRP-E) which ran between 1993 and 1997. The project was implemented in five arid districts - Wajir, Marsabit, Mandera, Garisa and Turkana. Its focus was similar to the IFSP-E components - water supply, livestock, health and drought management - which were administered under three categories – drought management (drought monitoring and preparedness), institutional development (cross-sectoral coordination) and community participation (community identified and prioritized projects). As one of its outcomes, EDRP formulated the Arid Lands Resource Management Project (ALRMP[35]- Arid Lands Project). This new project was implemented in 11 arid districts in northern Kenya during its first phase: 1996-2003. In phase II, which started in 2004, the project implementation area was extended to cover 28 semi-arid districts spread around the country's dryland regions. Mwingi was selected for implementation coverage during phase II. In both phases, drought management and community development components featured prominently. At the time of completing the writing of this dissertation, the Arid Lands Project phase II had come to an end. However, in Mwingi region, it had been rebranded into another project, this time a 'climate change' project. The United Nations Development Programme (UNDP) formulated the new project based on the structural model of the Arid Lands Project. This intervention was still on-going at the

[32] GTZ – Gesellschaft fuer Teschnische Zusammenarbeit has since 2011 rebranded into GIZ – Gesselschaft fuer International Zusammenarbeit, putting Germany's technical cooperation agencies - GTZ, InWEnt and DED under one umbrella

[33] PRA - An approach in the field of development used to incorporate the knowledge and opinions of rural people in the planning and management of development projects based on their prioritised needs

[34] Food for Work – is food aid distributed in exchange for work to participants in programs that are intended to promote agricultural or economic development.

[35] ALRMP is here further referred to as "the Arid Lands Project" as it is commonly called in Mwingi

time of the field work for this study and was funded by the World Bank-GEF Special Climate Change Fund. Another 'climate change' project that had been implemented in Mwingi was the 'knowledge sharing for climate change adaptation' implemented by ALIN - Arid Lands Information Network-Eastern Africa.

Both IFSP-E and EDRP undertakings encompassed development and humanitarian aid approaches to improving the well-being of local populations. In both cases the intervention formulations involved the Kenya Government, bilateral and multilateral agencies. The World Bank in particular has been involved since 1994 to the time of this study's fieldwork, with project names evolving from emergency drought recovery - EDRP, through arid lands resource management – ALRMP, and now to adaptation to climate change - KACCAL.

Other organisations that have worked in Mwingi with development and humanitarian aid placards include World Vision, Adventist Development and Relief Agency (ADRA), Action Contre la Faim (ACF), Genesis, Farm Africa, German Agro Action (GAA) and Rain Water Association (RWA). Key activities include relief food and water distribution, water infrastructure installations, techniques of dryland farming (soil and water conservation, drought resistance crop varieties) livestock management (including goat farming), sanitation, education, nutrition, health including HIV/Aid awareness and management and trainings cutting across many livelihood elements. Although there are theme specializations, many of the organisations tend to take a broad approach, by implementing more than one kind of activity. For instance, although Farm Africa is popular for the dairy goat project interventions, in 2010, it expanded its activities to dryland farming, distributing and supporting drought resistant crop varieties to farmers. Its dairy goat project has also been taken up by others such as the Arid Lands Project. Water infrastructure is undertaken by almost every NGO, perhaps due the priority need of the community.

The most active government departments in water and food access are: the Ministries of Agriculture; Livestock Development; Water; and Ministry of State for Development of Northern Kenya and other Arid Lands. At the time of empirical data collection for this study, the Ministry of Agriculture (MoA) was implementing two national projects: *Jaa Marufuku*[36] Kenya and Decentralized Agricultural Support Structures – DASS. Together with the Ministry of Livestock Development, MoA was also implementing another set of two projects: National Agriculture and Livestock Extension Programme – NALEP and ASAL Based Livestock and Rural

[36] *Jaa Marufuku* Kenya translates from Kiswahili as "Forbid famine in Kenya" or "Kick Famine out of Kenya"

Livelihoods Support Project (ALLPRO). The Arid Lands Project has been implemented under different ministries at different times depending on the central government political reorganisation. At the time of this study, it was implemented by the Ministry of State for Northern Kenya and other Arid Lands. Ministry of Water does not appear to have mobilised much external resources other than those allocated to it by the central government through the general annual budgetary allocations, which according to the Ministry staff, are barely enough. It mainly provides technical backstopping to other government departments and NGOs working on water issues on the ground.

A notable observation is that these interventions are launched from two distinct but linked perspectives: Government ministries formulate projects and mobilise donor funds for implementation. Normally these projects are national or regional in coverage, with Mwingi as one of the several targeted areas. The other is where NGOs mobilise their own financial resources and conscript the government departments in the implementation.

Despite all these external interventions, the people of Mwingi, particularly the rural households continue to experience difficulties in supporting their well being, a situation that is aggravated by drought events. This situation of impoverishment remains despite the conspicuous 'will to improve' demonstrated through these external interventions. In her book, *The will to improve,* Li (2007) discusses the social forces that produce, configure and limit the achievement intended by such projects. Aspects of reproduction of constraints to household adaptations are the focus of chapter seven, where they are explored in detail. Table 6 below summarises the nature of work of NGOs with physical presence in Mwingi as of 2010 i.e. they have offices in Mwingi.

Overall, based on the presentation of the study area above, it is evident that households have to contend with double biophysical risks in a context of social constraints. Specific insights from the Mwingi case are explored in details in the empirical chapters 5, 6 & 7. In the next session, attention is given to the Kenya's drylands as the larger context from within which dryland communities experience climate risks.

Table 6: NGOs with physical residence in Mwingi in 2010

NGO	General mandate
1. Action Aid	Relief food distribution - General food distribution - Food For Assets - individuals participate in labour provision for development of water and soil conservation infrastructure – dams and terraces through food for assets. In exchange they get food.
2. World Vision	Operates in Tseikuru and engaged in: - Education: construction of classrooms and sponsorship of needy children - Water and sanitation – access to safe and clean drinking water - Farming: improved agricultural techniques - Spiritual nourishment – distribution of spiritual materials
3. Farm Africa	Poverty reduction through dairy goat farming and capacity building - Increasing productivity of dairy goats and providing access to animal health care. Dryland farming - Distribution of drought resistant crop seeds Water infrastructure – dams, boreholes, ditches Tree seedlings for conservation of soil nutrients
4. ADRA – Adventist Development and Relief Agency	Water and sanitation: Access to clean water supply - Water infrastructure – sand dams, earth dams, boreholes
5. Action Contre Faim	Nutrition, water and sanitation and hygiene - Emergency nutrition program
6. German Agro Action/Kenya Rain Water Association	Water and sanitation - Rain water harvesting - Water infrastructure – Sand dams, rock catchments, roof water catchments in schools

Source: Author – field notes

3.2 Mwingi in the context of Kenya‘s drylands

3.2.1 Kenya’s drylands

Kenya’s drylands provide a suitable prism through which the context of adaptation by the community living in Mwingi region can be understood, both from the physical and social perspectives. Comprising of over 80% of Kenya’s land area, drylands support about 9.9 million people (approximately 34% of the country’s population) and 60% of the country’s livestock (Republic of Kenya 2002a, 2005). In addition, compared to arable highland regions of Kenya, drylands lag behind in socio-economic development due to historical and contemporary factors. In the discourses of vulnerability of dryland communities, it is the physical factors that receive the bigger share of attention, at the expense of the socio-political factors. While these physical factors are significant, they are only one side of the story – they exacerbate the already precarious condition of Kenya’s dryland communities.

According to FAO (2004), drylands are defined in terms of water stress, as terrestrial areas where the mean annual rainfall is lower than the total amount of water evaporated to the atmosphere, usually below 1000mm. The rains in drylands are not only low but also erratic, of short duration and often of high intensity. They are consequently highly erosive. Drylands are characterised mainly by hot and dry climate as well as scant vegetation cover. As per FAO's Agro-Ecological Classification (AEC), which is based on mean annual rainfall and its distribution, Kenya's drylands fall into zones V-VII, described as semi-arid, arid and very arid. All together, they are referred to as the ASALs – Arid and Semi-Arid Lands. Rainfall expectancy ranges from as little as 150mm in the very arid to about 900mm in the semi-arid (see Table 7 below). In Kenya, drylands are mainly located in the north and eastern southern parts of the country with a few parts in the central regions (See Table 8 and Map 3 below).

Table 7: The drylands of Kenya

Agro-Ecological Zone	% R/EO*	Annual Rainfall	% of Country Area
Zone V – Semi-arid	25-40	450-900	15
Zone VI – Arid	15-25	300-550	22
Zone VII – Very Arid	<15	150-300	46
Total			83%

*Rainfall/Evapotranspiration ratio

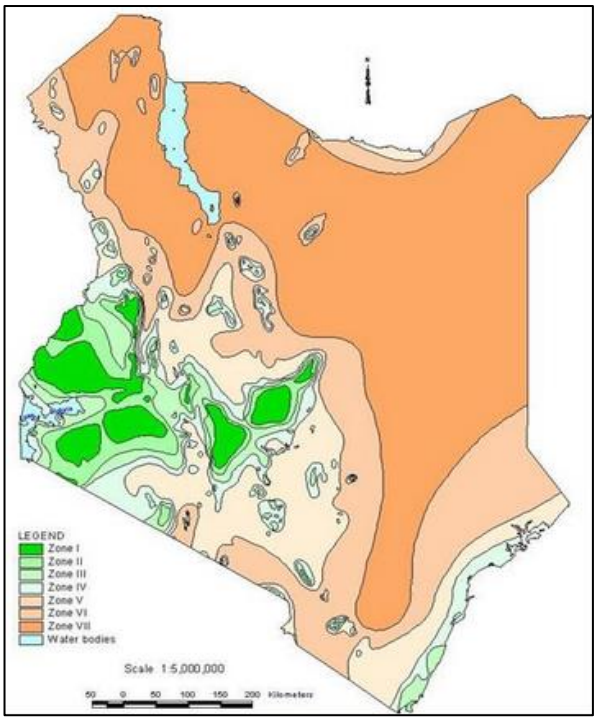
Source: Sombroek et al. 1982

Table 8: ASAL districts classified by extent of aridity

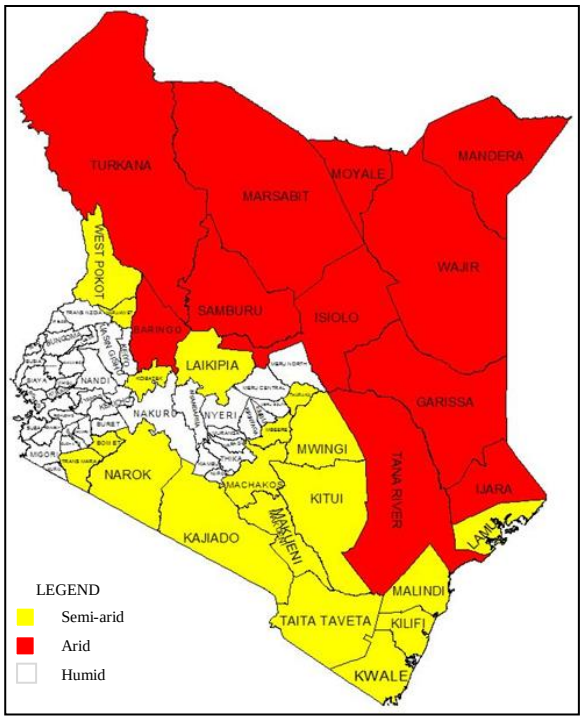
Category	Districts*	% Total ASAL
A. 100% ASAL	Turkana, Moyale, Marsabit, Isiolo, Wajir, Mandera, Garissa, Ijara	62%
B. 85-100% ASAL	Kitui, Makueni, Tana River, Taita Taveta, Kajiado, Samburu	25%
C. 50-85% ASAL	Machakos, Mwingi, Mbeere, Tharaka, Laikipia, West Pokot, Kwale, Kilifi, Baringo, Meru North	8%
D. 30-50% ASAL	Lamu, Narok, Transmara, Malindi, Keiyo, Marakwet	3%
E. 10-25% ASAL	Nyeri (Kieni), Rachuonyo, Suba, Kuria, Thika, Koibatek	2%

Source: Republic of Kenya 2005

*Districts: The names of districts have since increased due to their sub-division over time.



Source: Kenya Soil Survey



Source: Republic of Kenya 2005

Map 3: a) Kenya's Agro-Ecological Zones; b) the Arid and Semi-arid Areas (ASALs)

3.2.2 Drylands and droughts

In Kenya, droughts are considered the most common natural hazards, lasting for one or more years. There are claims that the frequency of droughts is increasing, from once every 10 years in the 1970's, to once in every 5 years in the 1980's, once in every 2-3 years in the 1990s and a norm since year 2000 (Howden 2009) (see Table 9 below). Although there is no one common definition of drought, its' key features include prolonged and abnormally dry and hot periods when there is scarcity of water for the normal needs of the affected community or ecosystem (Environmental Emergencies News 2004). Based on these features, various types of droughts are recognised in literature. Wilhite and Glantz (1985) have extensively elaboration on meteorological droughts, agricultural droughts, hydrological droughts and socio-economical droughts. Due to the nature of livelihoods production in Kenya's drylands, it is the agricultural drought that is mainly referenced in discourses of droughts. Agricultural drought attempts to explain the susceptibility of crops and pastures to water deficiencies during different stages of development. It affects not only the cultivators but also the pastoralists as they are forced to migrate from their homelands with their animals in search for pasture and water (*Ibid.* 115).

Table 9: Drought incidences in Kenya and areas most affected: 1970-2011

Period	Region Most Affected	Remarks
1972	All dryland areas	Livestock mortality and water shortage in most parts of the country
1973-74	Most parts of Kenya	Human and livestock deaths occurred in Northern Kenya
1974-76	Eastern, Central and Northern Provinces	Some pastoralists lost about 80% of their livestock; over 16,000 people affected
1980	Central, Eastern,, Western and Coast Provinces	Crop failure, livestock deaths and water shortage; over 40,000 people affected
1981	Eastern Province	Livestock deaths and crop failure
1983	Country-wide	Livestock deaths occurred particularly in ASALs
1984	Central, Rift Valley, Eastern and North Western	Large food deficit and livestock deaths; over 200,000 people affected
1987	Eastern and Central	Severe food shortage and livestock deaths in Eastern Province
1992-93	Northern, Central, Coast and Eastern provinces	Severe food shortage and livestock deaths Declared a national disaster; over 1.5 million people affected.
1995-1996	Most parts of the country	Declared a national disaster
1999-2001	Country-wide except Western and Coast provinces	High livestock mortality Declared a national disaster
2004-2006	Most parts of the country	Dryland areas hit most and high levels of livestock mortality; 3 million people in need of relief food Declared a national disaster
2008-2009	Northern, Central, Coast and Eastern provinces	Over 10 million people at risk of hunger; Declared a national disaster
2011	All dryland areas	Declared a national disaster; over 4.5 million people required food aid

Source: Mateshe 2011; UN-OCHA, 2011

The immediate impacts of drought include drying up of water resources, with negative implication on crops, pasture and domestic water availability. Diminishing pastures lead to emaciated livestock which consequently die if alternative feeding is not provided. It is estimated that during the 1999–2001 drought, Kenya lost about 26% of its livestock (Mogaka *et al.* 2006:20). Drying up of water sources in river beds and dams necessitates longer distance search for water for both human and livestock consumption. Failed crop harvest means immediate food unavailability to households resulting in food crisis which is the most visible effect of drought in the country. Between 1990 and 2011, Kenya declared six droughts as national disaster emergencies, allowing for a legislative move for mobilisation of national and international sources of relief food.

3.2.3 Drylands and land degradation

Kenya's drylands suffer from land degradation. Land degradation manifests itself in various forms, among them soil erosion, increased sediment loading of water bodies, loss of soil fertility, salinity and reduced ground cover. In degraded lands, the soils are generally poor in fertility, with high sand content, poor surface structure due to erosion and are often saline with low organic matter. Defined as the long-term loss of ecosystem function and productivity caused by disturbances from which the land cannot recover unaided (Bai *et al.* 2008), land degradation in Kenya is associated with unsustainable human activities that take place in already fragile areas and that are aggravated by natural disturbances such as drought or flooding. Muchena (2008) notes that the influx of people from high potential areas into drylands has led to subdivision of land into uneconomic land parcel sizes. This immigration by cultivators into drylands, he reiterates, has increased cultivation of marginal lands and overgrazing of pastures and forests encroachment. The results have been increased soil fertility exhaustion and land cover removal, factors that have all together accelerated the rate of land degradation. Other factors linked to degradation include introduction of exotic tree species such as *Prosopis juliflora*, fuel-wood harvesting, the suppression of the natural fire cycle, and the conversion of rangelands to human settlements.

By the early 2000s, approximately 30% of Kenya was affected by "severe" to "very severe" land degradation (UNEP 2002:61). An estimated 12 million people, or a third of the Kenya's population, depended directly on land that is being degraded (Bai *et al.* 2008). The droughts occurring in the period between 1970-2000 accelerated soil degradation and reduced per-capita food production (GoK 2002). A 2006 study by Bai and Dent identified the drylands around Lake Turkana and marginal cropland in Eastern Province as the areas of sharpest decline in net primary productivity – a measure of land degradation. The impacts of land degradation range from a reduction in crop harvest to pasture productivity, all which are closely linked to poverty and food insecurity.

3.2.4 Land alienation

Two forms of land alienation characterise the drylands – colonial large scale farms and creation of protected areas. During the colonial rule in Kenya, which lasted between 1889 and 1963, indigenous communities lost large tracks of land. For instance, it is estimated that the Maasai lost 50-70% of the land they once utilised to the white settlers for the creation of large commercial ranches between 1904 and 1911 (Sundstrom 2009). This doubled also as a loss of vital drought pastures. The post-independence establishment of Group Ranches under the

Land Groups (Representatives) Act of 1968 which aimed to provide a legal framework for ranch operations failed to return all original lands back to the indigenous communities (Mwangi 2007a). Similarly they failed to fully represent the collective interests of the community and to manage the ranches appropriately. This resulted in, from the mid-1970s, pressure for land individualisation through ranches subdivision (Mwangi 2007a/b). This often took place with unequal and unfair distributions of the individual parcels of land (Sundstrom 2009). The subdivision favoured wealthy cattle owners and Group Ranch committee members. Those who could not afford to bribe the committee members, especially the poor, got smaller parcels despite making formal and informal complaints (Mwangi 2007b). With individualised land holding, it was possible to lease or sell to cultivators who were keen to expand their farming land as a result of population increase in the higher potential arable lands. The in-migration of agriculturalists into the marginal drylands accelerated loss of extensive pastoral lands particularly amongst the Maasai. Umar (1997) notes a double tragedy whereby the loss was not only for the pastoralists but also the agriculturalists due to the fact that drylands are considered marginal for crop production.

The other significant form of land alienation was the establishment of protected areas, an action that restricted access to grazing and water sources. With the exception of Mt. Kenya and Mt. Elgon National Parks, all the other Kenyan protected areas are located in drylands. Table 10 below captures some of the protected areas in Kenya based on size. Before their alienation from the hosting communities, these lands had served as grazing lands for the pastoralists.

Table 10: Some of Kenya's protected areas

Name of Protected Area	**Year Gazetted**	**Area in Km^2**
Tsavo East National Park	1948	11,747
Tsavo West National Park	1948	9,056
Losai National Park	1976	1806
Kora National Park	1989	1,787
Sibilio National Park	1973	1570
Maasai Mara Game Reserve	1974	1,510
Rahole National Reserve	1976	1,270
Marsabit National Reserve	1962	1,198
South Turkana National Reserve	1979	1091
Meru National Park	1966	870
Samburu National Reserve; Buffalo Springs; Shaba National Reserve	1948	833
Mwingi National Reserve[37]	1979	745
Mount Kenya National Park	1949	715

Source: Sindiga (1995:46)

[37] Formally known as North Kitui National Reserve

3.2.5 Inequitable allocation of development resources

Drylands, particularly the northern rangelands occupied by pastoral groups such as the Turkana, Pokot, Rendille, Ariaal, Boran, Samburu and Somali have since independence been administered differently from other parts of Kenya (Verma 2010a). After independence, there was civil unrest across this region as the Somali community resisted forceful inclusion into Kenya despite their voting wish to join greater Somalia in 1962. The ensuing resistance, referred to as the *shifta* war, entailed mainly the ethnic Somalis in northern Kenya taking up arms against the newly independent Kenyan government. The war resulted in death of livestock, shortage of water, outbreak of diseases, massive malnutrition and lack of medicine and health care. Many male members of these pastoral communities were put into concentration camps while others were killed. Consequently the lives of these pastoralists were impoverished leaving them vulnerable to other changes and risks.

Development investments in the country were predominantly directed to the high-potential agricultural areas thus receiving the bulk of support in installation of infrastructure such as roads, water and electricity. Eriksen and Lind (2009) note that many of the drylands were considered uneconomical to justify such investments.

> Until recently, development policy and planning in Kenya regarded pastoralism as unproductive and inherently destructive to the environment. The allocation of public resources in Kenya has favoured the high-potential farming areas of the former 'White Highlands' in central and western parts of the country.
>
> Eriksen and Lind 2009:13

These historical factors have laid foundation to some of the contemporary issues such as migration and conflicts that underlie the vulnerability of dryland communities to impacts of drought.

3.2.6 Population growth and migration

The drylands population has over the time increased, not only due to natural growth but also due to immigration from the already highly populated high rainfall regions. For example, Machakos District's population density had increased from 50 persons per square kilometer in 1979 to 144 persons per square kilometer in 1999 (GoK 2009), while the population of North Eastern Province (now Kitui County) increased six fold between 1989 and 2009 (Fitzgibbon 2012:5). The result has been increased pressure and competition for land and water resources in the drylands, which exacerbates environmental degradation and resource access conflicts (McCabe 2004).

There are various forms of migration of people and livestock in the drylands. In particular, the semi-arid zones, due to their location as transition zones between the semi-humid and arid zones, are target for immigration. On one hand, from the humid and semi-humid zones, population pressure and demand for expansion of farmlands result in migration into the semi-arid zones. For instance, after independence, the arid Laikipia region became the target immigration destination by small holder farmers of the high potential farming areas of Nyeri district (Holdener 2007:14).

Out-migration for labour is an important household livelihood strategy in the drylands particularly among male members of households (Gray 2011; Smucker and Wisner 2008; Eriksen *et al.* 2005). Although often hailed for the remittances to sending regions, Greiner and Sakdapolrak (2012) note that labour out-migration also has negative feedback effect on environmental change and labour force availability in the sending areas. These migration dynamics hence play a role in the socio-economic status of the rural-based households.

3.2.7 Drylands and conflicts

Kenya's drylands are predominantly occupied by herders. The regions have a long history of conflicts (Schilling *et al.* 2012:2). Frequent droughts necessitate mobility of herders and their cattle in search of water and pastures. Once in contact with sedentary agro-pastoralists where land is more privately than communally owned, conflicts arise from disagreements on pasture and water access rights (Eriksen 2009). Another form of conflict is cultural. Cattle raiding among pastoral communities is an age-old tradition that originally served cultural practices. Among the Turkana, Maasai and the Pokot, young warriors of the society had to build their wealth and raise bride price by raiding cattle from neighbouring clans and tribes. Raiding from neighbouring communities was also a way of restocking after livestock deaths due to drought (Schilling *et al.* 2012). With commercialisation of the pastoral economy as well as easy access to small fire arms,[38] cattle raiding is no longer a cultural practice but a commercial and a criminal activity (Cheserek *et al.* 2012).

Overall, conflicts contribute to migration decisions by affected households as well as to the size of herd a household keeps at a given time. Kiamba *et al*. (2011) note that conflicts may motivate households to move away or keep smaller herds in fear of further raiding attacks. Involuntary movements of households due to insecurity mean that the rhythm of livelihood

[38] The breakdown of the Somali Government is viewed as the cause of a porous border between Kenya and Somalia allowing movement of illegal fire arms. Cf. Mkutu K.A. (2006) Small arms and light weapons among pastoral groups in the Kenya-Uganda border area. *African Affairs,* 106(422): 47–70.

strategies is interfered – for instance, planting is not done on time, resulting in increased probability of reduced harvest. The loss of valuable pastoral asset, the livestock, destabilises normal livelihood strategies thus also contributing to increase in poverty (Krätli and Swift 2000).

3.3 Conclusion

Although drylands comprise a huge percentage (80%) of Kenya's landmass and their biophysical characteristics have a bearing on rain-based livelihood production, socio-political factors play a vital role in the ability of dryland communities to support livelihoods in the face of climate risks, particularly drought. Historical land alienation facilitated by the colonial rulers for large-scale commercial farming as well as creation of protection areas – parks and reserves - deprived off agro-pastoral and pastoral-based livelihood communities access to vital resources. A history of unequal national resources distribution reflects market failure whereby drylands have been regarded as uneconomical for investment in public goods. The biophysical challenges therefore interact with the socio-political aspects to define the vulnerability of drylands communities. The numerous external interventions that are implemented in Mwingi do not appear to have made significant changes on the livelihood of the local people as many rural households remain impoverished, a situation that is aggravated by drought events. The will to improve is observed but transformative achievements are difficult to verify. This can be understood in light of Li's (2007) social forces that produce, configure and limit achievements of such interventions. It is from this context therefore, that households undertake adaptation practices. Resulting disasters such as famine and conflicts can therefore be seen in the perspective of Wisner *et al.*'s Pressure and Release model where natural hazards intersect with root causes, dynamic pressures and unsafe conditions of contextual vulnerability to result in disasters (2004:45-78).

Having elaborated the micro and macro ecological and socio-political context in which the people of Mwingi live and experience droughts, the next chapter will delve into the field research methods deployed to collect data on how households' adaptation in the face of climate risks can be understood.

CHAPTER FOUR

RESEARCH METHODS

4.0 Introduction

This study sought to understand household adaptation to uphold their well-being in the face of climate risks based on perspectives of contextual vulnerability. Qualitative and quantitative primary and secondary data collection methods were employed to enable this exploration. The study relied mainly on qualitative methods while the quantitative methods were used to embellish the qualitative ones. Specifically, data was collected on:

i. how the people of Mwingi perceive climate, changes and variability thereof
ii. importance of climate to people's livelihoods
iii. strategies and resources that the people use to overcome challenges occasioned by climate risks
iv. the constraints they encounter in the endeavour to uphold their well-being in the face of climate risks
v. how they make use of self-help groups in their efforts to manage livelihood challenges among them climatic challenges
vi. how external actors – governmental, non-governmental and private sector organisations make use of self-help groups to help the people of Mwingi

The objects of data collection comprised the rural[39] residents of Mwingi and the external actors (governmental, non-governmental and private sector organisations) working in this region as these partly provide the interactions through which local population experiences effects of macro structures on their adaptation efforts.

Primary data was mainly qualitative and was obtained through semi-structured interviews, focus group discussions as well as participant observation. In order to triangulate data collected, add quantitative elements to the study and create room for identification of any significant differences amongst households located in different agro-ecological zones of the Mwingi region, a semi-structured survey was also undertaken. In addition, spontaneous informal conversations were also used to pick insights not covered through the organized interviews. In these scenarios, no predetermined structured questions were used hence leaving it open and flexible to fit the case at the point in time. Gained insights were recorded in the field diary in the evenings and referenced during the data analysis.

[39] Rural residents were targeted based on the assumption that they have their largest proportion of livelihood support derived from farming. This was estimated as residents living 5km away from an urban settlement.

Secondary data was collected from published as well as grey literature. Published materials – books and journal articles were accessed in libraries in Germany and Kenya as well the worldwide web. These were reviewed to understand nature of past research works on climate change related to adaptation as well as provide appropriate theoretical and analytical frameworks for guiding the study. Grey literature included documentary material such as policies, programmes, projects, meetings, bulletins and workshop reports sourced from government and non-governmental organisations. They were used to collate knowledge of the studied households' contextual social, economic, political and historical organisation thus providing base insights of contextual vulnerability. Statistical records on elements such as population census, rainfall data and community groups' registration helped to supplement primary data.

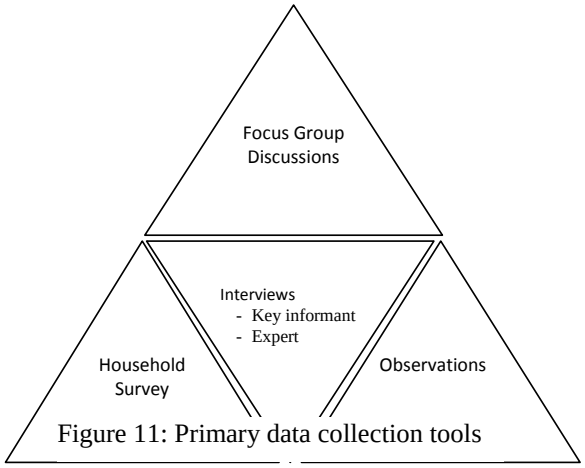


Figure 11: Primary data collection tools

In the following section, the procedure and experience of using the primary data collection tools are briefly described. While the survey embraced a level of randomness, the interview respondents were identified purposively and through snowballing. External actors targeted in the interviews were officials representing their organisations and working on themes such as water, food aid, farming and livestock production, nutrition and sanitation.

4.1 Semi-structured interviews

As a data collection tool, the semi-structured interview is based on the use of an interview guide – a written list of questions and topics that will be covered in a particular order (Bernard 2006: 212). The interview is characterised by minimum control over respondents' response with the idea to get them to open up and express themselves in their own terms and at their own pace. However, the method allows the interviewer to follow information leads. Two types of semi-structured interviews were utilised in the study: key informant interview and expert interview. The interviews were conducted on a face-to-face interface in a setting familiar to the respondents, mostly at the homes of the respondents in the case of key informants or in the office in the case of expert interviews. As noted by Bernard (*Ibid)*, semi structured interviews are fairly inexpensive and simple to conduct. In addition, they are flexible since

questions and topics can be added or omitted during the interview as the case may require. They also allow the respondents enough leeway to provide information that represents their special knowledge and perspectives while keeping the interview focused on the topics of discussion.

Interview guides were prepared before conducting the interviews and served as aid memoires to the interviewer, hence keeping the interview sessions moderated and on track. All interviews were recorded with a voice recorder after prior request to and consent by respondents. This method of recording was preferred as it causes minimal distraction to the conduct of the interview and captures everything e.g. intonations, elements that are missed when taking notes.

4.1.1 Key informant interviews

Interview respondents were identified from the local community purposively and through snowballing. The criteria to qualify and identify key informants included participation in projects facilitated by external actors; adoption of practices advanced by these external actors; non-interaction with external actors in livelihood practices; and leadership role either in community self-help groups or in the village in general. Snowballing, is a non-probabilistic referral sampling technique, which relies on using existing study subjects to recruit future subjects from among their acquaintances (Van Meter 1990). It was assumed that persons identified under these criteria had a good understanding of the different sub-themes of the research. Starting at the organisations such as the Ministry of Agriculture or the Arid Lands Project, the researcher was directed to specific community members who had participated in their projects. Once contacted, these members were asked of reference to other members fitting the desired criteria e.g. at the end of an interview a request would be posed: "in the neighbourhood, do you know of a person who does not participate in these projects? Please give us information on where he/she is located so that we can also visit and chat with him". The emphasis was laid on exhaustion of coverage of the theme and not so much on the numbers. In total, 17 key informant interviews were undertaken.

4.1.2 Expert interviews

These focus on expertise in a certain field of activity and are intended to reconstruct the knowledge of experts. According to Berg and Lune (2011), experts are taken to be persons who have a high degree of skill and knowledge in a certain domain, field or industry due to long time experiences, and have status, power to act and decision-making opportunities based

on these skills and knowledge. In expert interviews, the interviewee is of less interest as a (whole) person than in his or her capacity to bring an expert for a certain field of activity.

For this study, the expert interview targeted relevant government, non-governmental and private organisations in the study area especially those working on land use, water supply and food security, livelihood improvement and access to credit. The aim of these interviews was to assess the role of external actors' actions in defining households' vulnerability context. Specifically, participants in the expert interview were asked to detail what they regarded as the challenges facing the rural community of Mwingi and their undertakings in helping the people overcome these challenges. One major challenge experienced in using this tool was change of roles between expert and private personalities. In one expert interview case, a respondent tended to give a personalized opinion about the people of Mwingi than expert knowledge based on the work of his organisation. Effort was however made to re-track the respondent accordingly. The other difficulty experienced with the tool was scheduling of appointments. Some targeted respondents missed appointments without leaving a message for rescheduling. This required patience as return visits and calls were made to reschedule appointments.

Another disadvantage of expert interviews is that they are embedded in power relations such that those in powerful positions and who participate in an expert interview may conceal or fail to disclose certain relevant and important matters. To overcome this challenge, other tools such as the key informants or informal conversational interviews and documented materials supplemented information likely to have been missed in the expert interview.

Flick (2009:168) alludes to difficulties of recording expert interviews due to sensitivity or confidentiality of information, a scenario that may lead to interviewees refusing to be voice-recorded. Two expert interviewees refused to be voice-recorded. One case was from a food aid distribution NGO while the other was a government staff dealing with organisation and community development. Although these organisations deal with sensitive issues and data, the rejection for voice-recording did not appear to be motivated by confidentiality or sensitivity, but rather to unconfirmed fears of information being used against the interviewees. The situation was handled by simply going back to the old style "paper and pen". It was a slower method of recording but provided the compromise of being able to go ahead with the interview.

A total of 15 interviews were conducted with staff from Government, NGOs and private sector organisations.

4.2 Focus group discussions

Focus group discussions are small group discussions that aim to solicit information on perceptions, opinions, beliefs and attitudes towards an idea, a product, service or a concept. According to Krueger and Casey (2000), focus groups have four main features – (i) they comprise people, (ii) who possess similar characteristics and (iii) provide qualitative data in a (iv) focused discussion. The group should be small enough for everyone to have an opportunity to share insights and yet large enough to provide diversity of perceptions. The participants share similar characteristics in a way important to the purpose of the study. The focus group allows for collection of a range of opinions of people across several groups with the researcher serving as a moderator. An interview guide is used to guide the discussion in a natural and logical sequence.

Focus groups are relatively easy to assemble, inexpensive and flexible in terms of format, types of questions and desired outcomes. They provide rich data through direct interaction between researcher and participants. Since participants are not required to answer every question, they are able to build on one another's responses. They also help people build new connections.

A total of 6 focus group discussions were carried out. Four of these comprised mixed mature[40] men and women of farming households. To ensure that issues that may be more important to one gender than the other were brought out, two female-only focus groups were also organized. The most significant difference in separating the genders was notable in terms of priorities. In mixed groups, it was notable that men were more vocal on issues relating to livestock. In women only groups, crops and water dominated the discussions. This was a clear demonstration of intra-household differences in values. It was however not considered as a threat to the data obtained since the focus group was not intended to prioritise opinions.

In two groups, transect walks were undertaken in the hosting village before settling down for the discussions (see photo 1&2). These walks were excellent opportunities for breaking the ice and building rapport with the participants. They also enriched the data collection as they provided aid memoires in explaining the physical changes that had taken place. As we walked through the village, participants were enthusiastic to mention and show how and where changes in their environment had taken place – e.g. how the winds and the clouds behaved at different times of the year; pointing the hills where they took their cattle during the dry seasons; the most important vegetation/trees during drought; the water points; the soils and how

[40] Youth/young adults above 20 years were also included to increase the diversity of opinions

they were affected by drought or too much precipitation; the destruction of trees for charcoal production etc.

The first focus group was the longest, lasting two and a half hours. This group doubled as a pilot as it discussed the interview guide questions to ensure their appropriateness and wording. The others lasted between one and a half to two hours and concentrated on collecting data on perceptions of climate risks vis-à-vis other livelihood risks; nature of interaction of the local community with external actors as well as the nature of community organisation for climate risks management. The venue of the discussion was suggested by the participants - normally at the local shopping centre. The number of participants ranged between 5 and 9. The focus group discussions involving transect walks seemed to attract even passers-by who had not been invited to participate. They joined and participated in the walk perhaps on a curiosity basis and later moved out when the time came to sit down for further discussions. Throughout the discussions, emphasis was made that there was no right or wrong answer to the questions posed. This encouraged members to speak freely. But customary to the region, the women took time to offer their opinions as they waited for the men to first express themselves. Any threat of missing original voices of the women was managed through the women-only groups. All the discussions of the focus groups were tape-recorded and transcribed.

Some disadvantages were evident in the process of engaging the focus group interview as a data collection tool. Krueger and Casey (2000) note that focus group discussions can be sidetracked by a few individuals who are more talkative than others. The discussions also demand special moderation skills to keep discussions in track. The researcher's previous work experience in facilitation of social gatherings came in handy in moderating the group discussions and ensuring that less "outspoken" participants were encouraged to provide their opinions and experiences. Krueger and Casey (*Ibid)* also reiterate that the information generated through focus group discussions is not representative of other groups or even generalisable to the whole population. In this study, the focus group was one of the numerous tools used to collect data hence reducing the risk of depending solely on it for generalizations. In the beginning of the data collection, focus group discussions were used to not only pilot test the questions but also to identify pertinent issues regarding the subject of research.

Interaction with community groups (self-help groups) also took the format of a focus group discussion if the members were found together, especially during their weekly or monthly meetings. Otherwise, where only one member of the group was met, it was considered as a key informant

interview. Two community groups were interviewed using the focus group format.

Photo 1: Ukasi FGD transect walk – road damage due to flash rains

Photo 2: A women-only FGD in Ukasi

4.3 Participant observation

Participant observation is a systematic description of events, behaviours and artefacts in the social settings of a study aiming to discover the nature of social reality by understanding the actor's perception, understanding and interpretation of that social world (Marshall and Rossman 1989:79). As a data collection method, participant observation enables a researcher to establish rapport and blend within the community of study so that its members can act naturally (Bernard 1994; DeWalt & DeWalt 2002). The method goes beyond just observing to include natural conversations. DeWalt & deWalt (*Ibid*) recommend that participant observation be used as a way to increase the validity of the study, as observations may help the researcher have a better understanding of the context and phenomenon under study. They point out that validity is stronger with the use of additional strategies used with observation, such as interviewing, document analysis, or surveys, questionnaires, or other more quantitative methods. Schensul *et al.* (1999) find the method useful in enabling a researcher to get the feel for how things are organized and prioritized, how people interrelate, and what the cultural parameters are.

Participant observation was therefore adopted to help understand the everyday life in Mwingi as well as to obtain a general overview of the context, getting to know key actors in both a covert and overt role. As much as possible, the overt role was played where the researcher's presence was introduced by a member of the group observed (e.g. participant in meetings) whereas being in a market place did not create avenue for introductions. Events, objects and interactions provided fora for observation. These included the weekly market days at different market centres, the District Steering Group meetings and numerous spontaneous events such as the Kavuvwani climate change hearing workshop. Objects for participant observation included accompanying Government or NGO staff to completed or on-going infrastructure projects. Organised visits to these projects presented an opportunity to observe the discussions/exchange between the local residents and the sponsors of infrastructures. Through participant observation, it was possible to collect detailed description of events, behaviour of the people, interactions as well as practices. With time, it was possible to note power relations amongst actors and the resultant impacts.

One common disadvantage of participant observation is alternation or modification of behaviour by the group under study when people know they are being observed. While this may have happened at the beginning of interactions, with time, it seemed to melt away as people gained trust, more so because the study focus was not considered sensitive.

4.4 The survey

From existing documentation, particularly the numerous reports by the Arid Lands Project and observations made during the reconnaissance visit, it was suspected that there may be differences between people living in the mixed farming highland zones and the agro pastoral low lands. To ascertain that such differences if any would be captured, a survey was included in the tools of data collection. As noted by Fielding and Schreier (2000), although qualitative methods are better placed in providing in-depth information, they have limitations in giving magnitude of differences in numerical and statistical terms. Hence, the combination of qualitative and quantitative data provides a better understanding and enriches the analysis.

4.4.1 Sampling of survey respondents

The reconnaissance visit to the field in February-April 2009 allowed for observation and review of the population of study with the aim of establishing the sampling frame. The sampling frame was identified to comprise rural households of Mwingi, and the organisations – governmental, non-governmental and private – with interactions with the rural households on

matters connected to their livelihoods specifically water, food, credit and social organisation. The urban households were excluded based on the assumption that their livelihood is less directly dependent on farming.

Variables of influence e.g. land sizes in the upper zones of Mwingi West (Migwani) are smaller and are classified as mixed farming region. While these differences were also reflected in the survey, it was notable that there were changes that may, if the trend persists, render these differences untenable. In the higher land zones, it was remarked both by survey residents and expert informants that the rainfall distribution was getting more erratic and that they qualify to be classified as marginal as they increasingly failed to support crop production. Though these areas were not considered food insecure in earlier times,[41] they were increasingly featuring in the list of food insecure zones. This transition would require more systematic assessment in order to establish the extent of these claims. It was presumed that differences in size of land owned by households would have implications in a household's endowments based on productivity. However, this was not the case as households complained of not having enough seeds to plant or not having enough labour to prepare the land.

An attempt to obtain a list of households from the sub-location[42] administrators was made but inconsistencies limited this effort as a suitable guide to identification of survey respondents. First, the list was ten years old, having been prepared and based on the national population census undertaken in 1999. Its accuracy was therefore questionable since in ten years a lot of changes are bound to have occurred – deaths, births, marriages, migrations etc. Secondly, this list was not accompanied by a map for locating the households on the ground. Given the low population density, attempting to use names of households to locate respondents would have turned into a logistical nightmare given the poorly development transport system in the region. Lastly, the frequent changes in administrative boundaries would also have made the exercise futile as a household registered in one sub-location would be located in a different one after boundary changes.

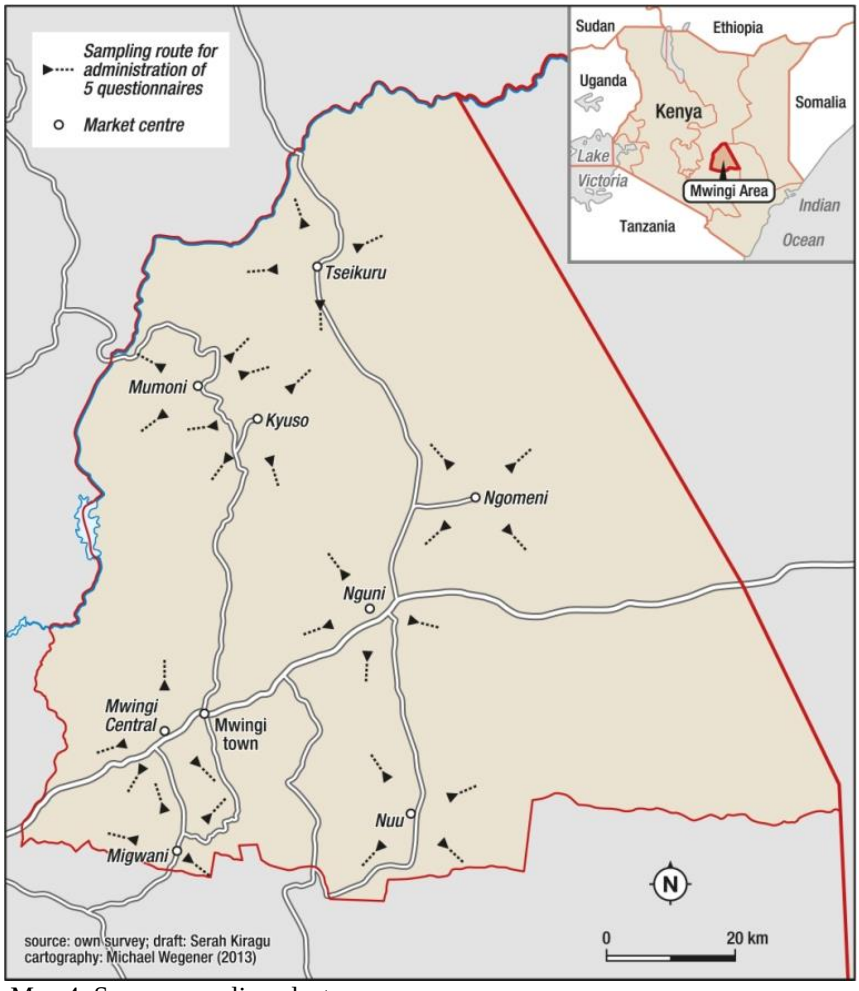
Eight prominent market centres which also served as divisional headquarters in the times of the "old Mwingi[43]" District were used as a base for locating survey respondents. Their distribution in all the agro-ecological zones (mixed farming, agro-pastoral and margin-

[41] Food security assessments are undertaken semi-annually to establish specific areas that deserve food aid. These are marked as food insecure based on an agreed standard criteria.

[42] Sub-location is the smallest administrative unit with an official government representation – the Assistant Chief. Below the sub-location is a village, headed by a village elder, who does not have an official/salaried position.

[43] Mwingi region before split of administrative districts

al/transitional) would enable identification of any significant differences. To avoid coincidence of selected a predominantly urban livelihood based respondents, selection of survey participants was undertaken along access roads 5 km away from the market centres. Four such access routes were identified and five households visited. If a visited household did not qualify for the survey e.g. because the household head and spouse were absent, the research team moved to the next homestead to locate another household. This replacement measure did not affect the information gathered. At the beginning of the survey in each cluster point, the GPS coordinates were recorded on the first questionnaire. These were then used to plot a map of the survey clusters as shown in map 4 below.



Map 4: Survey sampling cluster

4.4.2 Survey unit of analysis

For the survey, the household was used as the unit of analysis. It was important that clarity was established on the meaning of a household. But an analysis of social science literature

revealed that there was no standard definition of the concept of a household. Common threads in the definitions include shared resources such as food, residency, production and decision-making, relationship amongst members and a household head recognised by other members as so (Were 2006; van de Walle 2006; Randall *et al.* 2011). Members of a household may not necessarily share the same views and objectives in a given time and hence the views of one representative of the household may not necessarily represent the views and claims of the remaining members. In additions, household members may not necessarily be confined to one territorial ground, thus diluting definitions that restrict household membership to a spatial location.

Casimir and Tobi (2011), in their study on how a household was conceptualised in peer reviewed literature in the period 2000-2010, contend that the concept is seldom defined. When defined, definitions differ depending on culture, time and circumstances. They however note that in almost all cases studied, three facets appear to construct the concept of household - a group of people sharing resources, expenditures and activities on a regular basis for a specified period of time. They therefore recommend that scholars should improve clarity of defining a household by making reference to these three facets and dimensions.

In identifying a household head for interview for this work, age was also considered. While participating household heads could be aged 20 years and above, a cap was put on age 70. The study assumed that household heads above this age may not be vibrantly engaged in decision-making and action as their sons and daughters start to play a bigger role in their lives. The youngest participant in the survey was aged 25 years. However, this questionnaire was disqualified in the analysis as the responses given were found to be too wanting. The respondent was shy and literary evaded providing detailed responses by giving closed answers like "*yes"* or *"no"* without further explanation even after prodding. She would either offer an "*I don't know"* response or prolonged period of silence.

Among the Kamba community, mature males are allocated land by their parent(s) where they can construct a house and undertake production activities. This forms the first basis of independent decision-making and thus can be considered to constitute a very basic household. When a woman marries, she joins the man in his house and becomes part of decision-making[44] of that unit. In recent times, unmarried females can also inherit land from parents or even buy it and form their own households. In this regard, a household can be observed to be

[44] The nature and level of decision making varies since the male partner is recognised as the main decision maker.

residentially distinct, although not all residential dwellings constitute a household – e.g. young males can have a separate dwelling unit while depending on their parents for upkeep. Many men (usually household heads) are seasonal (even weekly) migrants, as they seek waged labour outside of the rural homes.

Given the context of this study, the household was defined as a person or a group of persons that forms a decision-making unit, comprising of at least one household head, sharing the same resources (e.g. land, livestock or income), decision-making and activities as well as expenditures (food, non-food items e.g. school fees). The members may be biologically or socially related - A UNICEF/KNBS (2008) study in Mwingi established that about 7% of children aged 0-17 do not live with a biological parent, while about 10% of the children have lost either one parent or both parents). Given the role of dual residence or intermittent migration of male household heads depending on the location of availability of non-farm employment, spatial delineation of a household was disregarded. This was clearly evident as female respondents stated that they could not make decision on sale of large household livestock without the go ahead from the absent household head.

Nonetheless, although the household was a principal unit of analysis in the research, considerations of intra-household and gender dimensions particularly in relation to division of labour, income and assets between household members were brought out through probing techniques.

Similarly, since the study's central subject of analysis was household well-being and adaptation, selecting a household and not an individual or a family was considered appropriate since it is in this unit that perception of climate and its impacts on the people's well-being are formed and experienced. Several households can constitute a family – e.g. various siblings with their stand-alone households belong to one family.

4.4.3 Household questionnaire

A face-to-face administered questionnaire was used on the basis of the low literacy levels of the population under study. This method is suitable because if a respondent does not understand a question, it will be explained, and if the question is not answered fully, probing will be done to obtain more complete data. The questionnaire comprised closed and open ended questions but efforts were made to minimize the number of open ended questions. The advantage of the fixed choice questions is that they are unambiguous for the purposes of analysis. The researcher worked closely with two research assistants who spoke the local language. This process ensured that the research assistants fully understood the content and spirit of the ques-

tionnaire. The two were trained to administer the questionnaire. To monitor effectiveness of collecting data through research assistants, the initial results and experiences were discussed in the evenings, thereby creating opportunity for clarifications in case of arising ambiguities as well as emphasis on clarity of recording responses. One significant issue that immerged was the age of respondents which had not been discussed during the initial meetings. This was sorted by clarifying the lower and upper age limits of respondents.

The questionnaire was administered to 160 households. It was divided into various themes: Household biodata - household characteristics such as household composition, assets ownership, descriptions of local climate, main livelihood activities and how they were affected by drought. Under farm production, the survey sought to establish patterns and explanations on choices of animals and crops cultivated by households. Based on the livelihood activities, respondents were asked how effective these were in upholding their well-being particularly during the dry and drought seasons. This theme solicited for challenges they experienced in undertaking adaptation activities. To explore interaction with external actors, survey participants were asked to discuss the organisations they interacted with and the nature of interactions. Since a component of the study involved understanding the role of self-help to structural constraints of adaptation, the survey tool explored engagement with and nature of self-help practiced by the respondents. Finally, the tool enquired into the theme of access to financial resources. During the analysis, two questionnaires were disqualified due to inadequacies of content. The statistical procedures undertaken were therefore based on 158 respondents.

4.5 Data analysis

During and after data collection exercises, the data material was re-read severally in order to start identifying recurring themes. This process helped to develop the nature of interpretations that the data could support. This was followed by efforts to infer what Terre Blanche *et al.* (2006) call organising principles underling the data material – examples of such organising principles in interviewees' language included normalcy, markets, self-help groups, projects (*Miradi*[45]*)*. Themes from these categories of recurring instances were then developed. Different sections of the data were coded as being instances of or relevant to the identified themes, while paying attention to the fact that some texts were relevant to more than one theme. On a word processor, these sections were highlighted using different colours and later a cut and paste function was employed to move bits of the text around. These bits of labelled pieces were thus clustered together under the code heading for further analysis and interpretation.

[45] Swahili name for "Project"

During the review of the themes with the collection of coded materials, more sub-themes were evident. Some were later left out into the main discussions because they did not bear much influence on the arguments brought forward. For instance, there were bits of interesting data regarding local knowledge of the environment. These are only mentioned in passing in the main text but not explored deeply.

The data on closed questions of the questionnaire was coded and entered into an excel sheet for statistical calculations. Data on open-ended questions was mainly considered together with the qualitative materials.

4.6 Protocol in the field

4.6.1 Arriving in the field

The field data collection task was divided into three phases totalling 9 months: the reconnaissance visit (February-April 2009), main data collection phase (December 2009 – May 2010) and data gap filling visit (March-May 2011). At the beginning of the reconnaissance visit, a research permit was obtained from the relevant government office. Visits to research institutions were also made with the aim of obtaining clarity of previous researches in the region and on the topic.

In Mwingi region, numerous courtesy calls were organised, starting with the District Commissioner's (DC) office. The DC is the lead administrator in a district and governmental procedures require that visitors introduce themselves to this office before proceeding to enter other levels of administration of the district. Given the theme of the research work, the governmental ministries of Water, Agriculture (MoA), Livestock and Development of Northern Kenya & Other Arid Lands which implements the Arid Lands Project, were earmarked for closer interaction and courtesy calls made. The Arid Lands Project was generous to offer a working desk in one of their offices. This would in the course of main data collection, provide strategic opportunity for participant observation. Other entities working in the area were identified during this reconnaissance period. These included NGOs: Action Aid (AA), Adventist Development and Relief Agency (ADRA), German Agro-Action (*Welthungerhilfe*), Farm Africa and Action Contre Faim. Private organisations which target the rural Mwingi Community were also noted e.g. micro-finance lending organisations such as Kenya Women Finance Trust, Jamii Bora, Equity Bank and Kadet. Open discussions were held mainly with the Arid Lands Project and MoA staff. Through accompanying the staff to the field e.g. for community

trainings, key issues of discussion were observed and noted. The observations gathered during this visit helped to shape and refocus the research design.

Initially, it was envisaged that the study would focus on social vulnerability to drought as a natural disaster. The emergence of adaptation to climate change discourse at the local level observed during this first visit motivated a slight adjustment in focus. The shift made was on the key research question. It was established that a mere assessment of nature of vulnerability variables as well as drought coping strategies would not add much value to works that have already been done. Instead, the design was readjusted and narrowed down to relating adaptation and contextual vulnerability through household well-being. This, it was envisaged would be of greater value both to theory and practice of adaptation studies.

During the main field data collection phase, long-term accommodation was sought in Mwingi town, to necessitate not only ease of movement to field sites but also to enable a more entrenched participant observation role. Living in Mwingi provided the opportunity of experiencing the day-to-day life of local residents. Although the conditions in the urban centre are different from the rural set up, there were many opportunities to witness how rural residents run their lives. Unavailability of tap water for instance meant that one had to keep in touch with the women who supply water from the river delivered by donkeys.

A key challenge witnessed at the onset of field work was management of transport. It was noted that hiring a vehicle for transport around the field was uneconomical for long periods. An attempt to use public transport means resulted in frustrations as public buses were very few. A small private vehicle was utilised to reach accessible sites while sites requiring 4-wheel drive were accessed by hitch-hiking on Government or NGO vehicles which would drop the researcher and the assistants at the nearest market centre from where interior locations would be accessed through walking or hiring of a motorbike.

4.6.2 Field assistance

The local language in Mwingi region is Kamba. Although the researcher could understand the language to some extent, it was necessary to deploy a translator. With the assistance of some staff at the district government offices, a community-development diploma student was recommended. In addition, the administration of household surveys required assistance, which was obtained from two assistants who were previously working for Action Aid but had been temporarily laid off when general food distribution (GFD) programme was scaled down. While the work of the translator assistant was straight forward, that of the questionnaire ad-

ministrators was not. Time was therefore taken to take all the three assistants through the process of what was expected of them, from the introduction when they approached a household to the recording in the questionnaire sheets. They were to state clearly that they wanted to talk to the head of the household – normally a husband, and in his absence, they were to talk to the wife, who is regarded as the number two of the household. If only children were at home, even if they were over 18 and still living with their parents, they were not to answer the questionnaire. Another important point of caution related to the essence of the questions posed during a questionnaire or interview administration. From the start of the interaction, the research assistants were implored to make it clear that the enquiry made was for academic purposes only. This aimed to curb the risk of raising expectations of the respondents. With so many external organisations working in the region, there was probability of mistaking the study with those of organisations that come to provide various forms of aid.

The importance of recruiting assistants from within the community cannot be overemphasised. From observations of interactions between the translator and the potential respondent, it was notable that a lengthy introduction was necessary and required that the translator gives information regarding which clan and village s/he came from. With this knowledge, the respondent would then attempt to relate his/her knowledge and interaction with the said clan. Although there were no cases where the research team was turned away after approaching a homestead, it was clear that the introductory small talk was variable. It appeared to make respondents feel they are opening doors to one of their own.

In addition to the courtesy calls at the district headquarters, more visits were made at smaller administration scales, specifically the sub-location level. A sub-location is the smallest administrative unit in Kenya's governance system and is represented by an Assistant Chief. In the absence of an Assistant Chief, effort was made to meet the village elder. The village elder is an appointed leader in a village. While a village elder does not occupy a legal position, he or she is respected and acts as an alternative focal point in the absence of the Assistant Chief – e.g. in case of an administrative emergency when the Assistant Chief has travelled. The Assistant Chiefs not only provided blessings in the entry to their jurisdiction but also provided vital information regarding their area e.g. maps, population distribution etc.

4.6.3 Recording

While the survey questionnaire was to be filled in the questionnaire sheets, all other forms of interviews were voice-recorded using a tape recorder and later transcribed. Before an inter-

view, the respondent was made aware that the conversation was going to be recorded and was requested to confirm if he or she was okay with the arrangement. All except two key informants okayed the request. The two key informants were adamant that they must not be recorded. In these scenarios, notes were taken down. It is however interesting to note that a conversation was always lively before the mention of recording. Many respondents changed their tones and appeared less relaxed when the conversation recording was in progress. In case where the interview took place in an office, one respondent even adjusted his tie and sat upright like he was preparing to talk to photo journalists. It is likely that some issues would be withheld during the time of recording of conversations. To ensure that occurrence of such a scenario was minimised, at the end of an interview, a respondent was informed and the recorder switched off. However, the research team did not leave immediately but allowed the conversation to wander a little into overtime and thereby revisiting some of the issues discussed earlier in the recorded interview. When some new information emerged, it was later noted in the *Field Diary*. Approximately 60 hours of voice records were made.

4.6.4 Pilot survey

Data collection tools – the questionnaire and interview guides were pre-tested with two main objectives: first, to test their applicability – in many cases, the administration of these two tools required translation from English to Kiswahili or Kikamba. Pre-testing allowed a check for the retention of meaning in the translated versions. Where difficulties were encountered, the English version was simplified. In some cases, a Kiswahili translation was included in the questionnaire as an *aid memoire* to the research assistants. The second objective of pretesting was to ascertain the time taken in the administration of interviews.

The questionnaire in particular was found to have been long and took two hours to complete. This time is long and creates situations where respondents get tired and lose concentration, thereby increasing chances of getting brief answers aimed at bringing the discussions to an end. With this experience, the questions in the questionnaire were reduced. This also helped to keep the discussions focused. In the end, the revised questionnaire took 50 to 70 minutes.

After training of research assistants on the content and translation, the researcher and the assistants undertook the pre-test with 10 questionnaires, to check if the respondents answered the questions as expected. The pre-test respondents were not part of the main survey. During the administration of data collection tools, the research assistants were monitored in order to minimise level of bias that could be introduced. Random spot-checks during the survey, of

how the research assistants were administering and filling in the questionnaire were undertaken and any anomalies discussed. At the end of the survey, the research assistants were brought back together for an evaluation of the task.

4.6.5 Supervision field visits

The researcher benefited from two supervisory visits in the field. The first visit was by a Kenyan-based mentor from Moi University and took place from 24th to 27th February 2010. This visit was planned to coincide with the pre-testing of the data collection tools. Since the mentor was conversant with the local language, it was easy to point out areas of translation difficulties and hence address them. The visit also allowed sharing of problems the researcher had already started experiencing and testing of possible solutions. The second visit was by the Germany-based supervisor and aimed to discuss the field operationalisation of the research design. It took place from 26th to 30th November 2010. By witnessing the realities of the field environment, he was instrumental in providing critical guidance for linking theory with the emerging field data.

4.7.6 Challenges in the field

One of the early challenges to note was in translation. My translator would pose a question to a respondent, and the respondent would answer in several sentences. However, the version translated back to English would be brief. With the researcher's fair knowledge of the local language, it was notable that the translator was summarising the information provided by respondents. Effort was therefore made to ensure that respondents' responses were translated in sentence-bits. The respondent was thus requested to pose after every statement to allow translation. In addition, the translator was advised to translate in a first-person version of the respondent.

Another challenge related to translation arose from the works of the research assistants administering the questionnaire. The two assistants had been employees of Action Aid before and seemed to include English wordings that were highly doubtful that they came from respondents. For instance, wordings such as "we are food insecure" or "we are vulnerable" could not have come from the mouths of the respondents since there are no direct equivalents in Kikamba or Kiswahili. Attempt was made to accompany the assistants to interview sessions to ascertain the circumstances under which such translation terminologies were used. It was found that issues of "food insecurity" would be translated from responses regarding inability to obtain sufficient food for respondents' families. Vulnerability would be used in situations where respondents described circumstances of poverty or even inability to manage situations

e.g. the case where traders buying local produce at low prices. After relating the original *Kamba* oral versions with the written translations, no alarming distortions of meaning were noted. However, the assistants were implored to as much as feasible write down responses just as they were communicated by the respondents without searching for a fitting technical terminology to summarise the descriptions provided.

The other challenge occurred at moments of questionnaire/interview administration. On approaching a homestead, effort was made to establish presence of a household head, normally a male and a husband. In his absence, the wife would be interviewed. On a few occasions where an interview was taking place with the female spouse, the male head of the household would return and join the interview session. This necessitated that the interview stops and the head of the household is briefed of what was going on. He would then be requested if the interview process could proceed. He would give a nod but would not go away. This appeared to make the female respondent hesitant to answer questions, in some cases preferring to say that she does not know the answer, or looking at the husband first to check for a go ahead to answer the question. In instances where the researcher felt that the interviews had not yielded full and independent responses, replacement interviewees were identified.

Distance, as earlier indicated posed movement and sampling challenges at the beginning of the field work. Mwingi region is 10,030 kilometre square. The poorly developed road network coupled by sometimes hilly landscapes complicated ability to move from one field site to another. Similarly, the lower parts of the region have low population density whereby distance between two households could be as large as 3km. Distance had an implicating challenge to the study: households' homesteads were not organised in a regular manner that can be easily identified. This necessitated flexibility in sampling. Since no list of settlements is available and distances between homesteads were varied, the study deployed a cluster approach along transect (road) lines. These clusters were identified along access roads dilating from a single market centre and were calculated[46] from at least 5 kilometres from the trading centre.

4.7 Conclusion

This chapter has explored in depth the data collection methods used to operationalise the study questions in the field. Qualitative methods comprising of key informants, expert interviews, focus group discussions and observation were the main tools of data collection. A survey was also included to embellish the qualitatively collected data. Data analysis process was also highlighted. Lastly, the chapter presented the procedure of commencing and conducting

[46] The calculation was achieved by taking note on the vehicle used to move from the market centre to the field site direction.

the field work. Challenges involved in the operationalisation of the data collection tools as well as how these challenges were overcome were elaborated.

The next chapter introduces the empirical findings. It focuses on perception of climate and the impact of climate risks on households' well-being.

CHAPTER FIVE

CLIMATE RISKS AND HOUSEHOLDS' WELL-BEING

5.0 Introduction

Perceptions of climate and the impact of climate risks on households' well-being are the focus of this chapter. Additionally, the chapter reflects on the hypothesis that climate studies at local levels are better framed from perspectives of climate risks than "change" or "variability". The chapter also provides for confirmation of the claim that households' adaptations are better framed in the context of upholding households' well-being than reducing climate risk impacts. The chapter is presented in three sections namely: how households perceive climate and weather; the impacts of climate risks on households' well-being; and strategies for upholding households' well-being in the face of climate risks. Conclusions are derived from each section and presented at the end of the chapter.

5.1 Climate and weather in the eyes of local households

The way the people of Mwingi perceive climate and weather is important for two key reasons. On one hand, it helps in understanding the meaning climate and weather have in their life-worlds. On the other hand, it helps to bring out points of divergence or convergence as local people interact with external actors in the context of the climate change discourse.

5.1.1 Normality of variability

The climate and weather of Mwingi are perceived by the local people as variable and normal. The Kiswahili word *kawaida*, meaning 'normal' is used to introduce a discussion on climate and weather. Furthermore, there exists no semantic difference between climate and weather either in Kiswahili or the Kikamba tongue of Mwingi households, the two languages used during the field work. The differentiation is however brought out through temporal delineations expressed through narrations of the far past versus the near past without clear-cut boundary between these two pasts. The average climate is therefore captured in present tense, e.g. *this area is very dry and very hot .....the rains are unreliable most of the times...*while weather is described in specific recent pasts e.g. *the rains of this season...the rains of last year.* Rains were mentioned by respondents first, before talking about other elements of climate such as heat and wind. This is due to the vital role that precipitation plays in agricultural production, the main mode of livelihood support.

In general, it is through the characteristics of precipitation, heat and wind that households narrate about their climate and weather. They describe the region as generally dry, with low and unreliable rainfall. Although description of rainfall resonates with the meteorological average of arid and semi-arid areas, the households' reference to low rainfall is specifically linked to the importance of precipitation to vegetation and crop growth. This is expressed through narratives of performance of crops and livestock, e.g. *everything dries up; crops wither...livestock die,* pointing to the derivation of climate perceptions from the role of rainfall in people's livelihood practices.

Unreliability of the rains is also noted through not only variability in time and amounts but also in space. The residents recognise rainfall patterns as sporadic, whereby a heavy downpour is experienced within a very short time and in some villages and not others. As one respondent put it:

> **"....**rain? here? it rains, sometimes it does not rain, when it comes, it rains in a few places and skips others (*ikikuja inaruka*) and leaves crops to dry. If it rains well in one season, it can stay for another 2 years without good rains. If one plants in September, millet, cow peas and green grams will do well, but the one who plants maize will not harvest well as the rains will be little."
>
> *Mzee Mkonzo*

> "Here, rain is little. You see it has rained this year, we can stay for another three years without rain. Even what has rained is not enough."
>
> *Ukasi FGD*

This experience of spatial variability has a bearing on the adaptation practices that households undertake as will be discussed in chapter 7.

Another element of climate familiar to households is wind. Strong winds are experienced in both dry and wet seasons. Though residents do not talk of any major destructions resulting from wind in the recent past, they blame the winds partly for taking away rain-bearing clouds to other areas, denying the region the much awaited rain waters for their crops and livestock pasture. Winds are therefore part of the local climate knowledge as they are perceived to forecast the amount of rains in a season. Respondents from transect walk group discussions indicated how wind was linked to rains. They reiterated that when it was too windy, they predicted that the rains that follow would not be enough.

Although the normalcy of sub-optimal climate and weather was acknowledged – normal climate variability - some households expressed perception of changes. Their observations related to the uncertainty and irregularity of the otherwise predictable weather patterns through various variables – rainfall onset, amounts, distribution and cessation. Box 1 below captures several of these sentiments with regard to changes in weather patterns.

The normalcy of variability of climate and weather, and their relevance to local households through rain insinuate that characteristics of climate and weather are neither new nor neutral to the people. Local people live within the perceived constraints posed by climate and weather. External discourses of climate change cannot therefore afford to discuss climate and weather as if they were new experiences as shown in the case of the Kavuvwani climate change community workshop presented in the introductory chapter. Doing so disregards the wealth of experiences the people to whom climate and weather play a central livelihood accumulate.

Box 1: Irregularity and uncertainty of weather and climate

"The long rains set in late September or early October and go on till early December. But nowadays these rains are not regular. Sometimes they start in November and end in January.... The current rains are not normal. For about 10 years we have not experienced such rains. There is normally sudden downpour then it disappears. Then it comes after a few weeks or even a month.

...We used to be certain that at a particular time, rain would come. But nowadays, we are no longer certain. It has rained now, but we are not sure that we will have rains in the next 2-3 years."

Mumoni women FGD

"Only a few crops manage to germinate. Cow peas, green grams and sorghum planted on soft soil will do well. The rest dry up. We start to plant once again in April. The rains of this year are different. I have not seen this since I was born. They started in February and they are still going on. Those who have planted...are already harvesting cow peas...and if we see the clouds, we know it is going to rain...it seems God is changing the climate.

.....(on changes in climate and weather)...They announced in the radio. There is a lot of water now in the forest, this is not normal. It seems the *Mwaatho* long rains (Oct-Nov-Dec rains) this time would come from October. Last year they also set in Ocober. Now the short rains look like the long rains. These changes are recent. They have come in the last season and this season. We have not seen anything like this."

Ukasi FGD

"When I was young, it used to rain and there was food. The way things are getting on, it is like the rains are getting less. In the past, the dry season would last for about a year; nowadays the rains are coming after 3 years, I fear that in future, they might come after 5 years. This means there are some changes somehow."

Ukasi Watch

Researchers whose works focused on perceptions are resourceful in comparing and understanding local people's perceptions of climate and weather. Rao *et al.* (2011) intensively compared perceived versus measured rainfall variability in Mwingi and four other districts within *Ukambani* region. In Makueni district, which neighbours Mwingi, Ifejika Speranza (2006) looked at the statistical inter-station variations in rainfall. Both cases yielded comparably similar conclusions – that the local people were well aware of the variable nature of their climate. The work of Rao *et al.* (2011) within Mwingi, as well as that of researchers in other

parts of Africa (c.f Bryan *et al.* 2009; Mertz *et al.* 2009; Nyongo *et al.* 2007) corroborate the local communities' perception that climate has in the last decades been changing. But when compared with observed long-term rainfall trends calculated from detailed long-term daily and monthly records of between 1957 and 2006, Rao *et al.* (2011:281) found no major detectable change in the rainfall during the past four to five decades, an observation that is in line with Adger *et al.* (2003) claim that it is difficult to unambiguously distinguish human-induced change from natural variations in climate at small scales. Possible explanations have been put forward on this observation. Rao *et al.* (2011:286) sought answers in changes in other aspects and picked on decline in maize yields when the farmers they studied associated maize yields with reduced rains. According to their assessment, the low yields were occasioned by low use of fertilizers which could be tracked to the effects of market liberalisation policies executed in the 1990s under the structural adjustment programme. The policy changes resulted in sharp increase of fertilizer prices leading to a decline in the amount of nutrients applied to cultivated farms. Hartter *et al.* (2012:9) who undertook their study on perceptions of climate change in the biodiversity conservation hotspot of Albertine Rift region of East Africa made similar observations and explained that people may base their perceptions of magnitude of extreme conditions or events on the resultant hardships. Maddison (2007) also notes that farmers tend to place more weight on recent information than old one. The changes the farmers perceive are therefore observed to be within range of variability with which they are familiar. The element of amplification of risk (Pidgeon *et al.* 2003) may also play a role, as households make reference to information obtained from mass communication media such as radio. According to Pidgeon *et al.* (2003:23), social processes such as risk communication can modify the perception of that risk. It is however notable that whether local households perceive changes in weather or climate, climate risks, specifically drought impacts, which affect the availability of precipitation for domestic use, growth of crops and livestock pasture remain a key element in peoples' well-being.

On the whole, the perception of change is influenced by multiple factors, some of which are non-climatic and therefore not overtly visible to the households. Macro factors such as market liberalisation, personal factors such as age and responsibilities come into play. A 35 year old household head may have vague notice of the impacts of a drought that occurred 15 years ago when he did not have the responsibility of providing for a family. Changes in the sensitivity of a farming system can be confused for changes in rainfall as Simelton *et al.* (2013) found out in their study of perceptions of changes in rainfall in Malawi.

Memory is also a poor reflector and tool for discerning and distinguishing climate change and variability. As observed in the findings of this study and those of other researchers, there are many factors that also influence human perception and memory. Recent events are remembered more vividly than past events. Brondizio and Moran (2008) note that, for most farmers, memories of extended drought tend to decrease significantly after 3 years. Similarly, non-climatic dynamics undermine the individual memories of climate as they affect factors of livelihood production.

5.1.2 A challenge to climate forecast knowledge systems

The uncertainty of the weather is perceived to challenge the traditional weather forecast methods, reproducing more uncertainty. The situation is worsened by the waning trust in government sponsored weather forecast information, which is dismissed as ineffective due to past experiences.

> "You know, nowadays is not like before (*kitabo/zamani*). In the past, there were things that people would observe and say that it is going to rain. But nowadays, even if you observe those signals, don't think it will always rain. Those days, there were things we could observe, e.g. heat. When the heat was too much, we would expect rains to follow soon. But nowadays, it gets very hot but no rains! There are also some trees - acacias, when the rains are about, the acacias start producing flowers. After the flowers fall, the leaves come out. It is a signal for us to start planting. But nowadays the trees will produce the leaves and no rain comes. - *Mvua inakosa!*. The rains have failed!"
>
> *Mama Mweni*

> "We also listen to the radio for weather forecasts, but the information is not always accurate: e.g., they tell us there will be an El nino but we don't get it. We feel they cheat us!"
>
> *Mumoni Women FGD*

Box 2 below highlights some of the traditional weather forecast signals used in the regions.

Box 2: Traditional weather forecast signals

1. Sprouting of trees like acacia and baobab trees – indicator of approaching rainy season
2. Weathering of trees – on-set of the dry season
3. Swarming of birds across the sky – rains are about
4. Cloudiness, hot temperatures, calm wind, a lot of thunder, lightning - rains are approaching
5. The birds change the sound they make, their singing style

Source: Compiled from focus group discussions and open-ended questionnaires

Chang'a *et al.* (2010) in their study of indigenous knowledge in seasonal rainfall prediction in the south western highlands of Tanzania made similar observations: plant phonological characteristics were the mostly used indicators of seasonal rainfall prediction; the perceived increased climate variability reduced the accuracy of predictions of both indigenous forecasting and the Tanzanian Meteorology Agency predictions.

5.1.3 Severity and causes of changes in climate and weather

The severity of the changes is perceived through impacts on previous adaptation strategies. When most areas are affected, mobility as a long-serving copying strategy is made meaningless as there is nowhere to move to. With drying up of pastures, livestock survive on less palatable vegetation varieties that they don't eat under normal pasture availability conditions. The situation gets dire when financial means are also exhausted. A focused group discussion in Ukasi village articulated this severity:-

> "That last drought (2008/2009) has not been witnessed before. In the past, it would rain here (Ukasi Location) and not in Mwingi (Location). The people of Mwingi would bring their livestock here. If it does not rain here, we would take our livestock to Endau (*the hills)*. But last time, all places were affected. The cows ate *Gisivü (Boscia coriacea Pax.)*. This is unheard of, *Gisivü* is only eaten by donkeys. We used to give our livestock *Kithunzu* tubers (*Thurnbegia guekeana*). The last drought is not the drought to compare with others! The others do not kill our cattle like that. The 1984 drought, people had money. In the last one, there was no money.
>
> *Ukasi FGD*

The statement about money not being available during the 2008/2009 drought compared to 1984 drought, points to climatic and non-climatic influences on the perception of the impacts of drought. The focus group discussion captured the magnitude of impacts of the former drought through the massive death of livestock due to reduced water and pasture. Additionally, they alluded to a non-climatic element that qualified the drought as severe - the erosion of savings. People did not have money to cater for livelihood needs in the absence of income obtained through rain-fed production. Although not explored further, it was clear that lack of money was not linked to drought alone. This implies that the perception of changes in the variables of climate and weather, while sometimes misconstrued to be a confirmation of a changing climate by people directly affected, has to be understood in its specific context. Climatic and non-climatic factors synergise to determine how local people perceive drought impacts. In the cited case, availability of money to cater for household needs was a factor of comparison between the severities of impacts of two droughts.

The causes of these perceived and observed changes are mixed and localised, far removed from the global climate discourses. Some take it to be the nature of the region, created by God to be so and compounded by human's

Box 3: Explaining the nature of climate and weather

i. Nature/God

Rainfall patterns are God's plans - when the planting season comes, we plant, whether there is rain or not, we don't know, we simply take chances. Then we wait and see if it will rain and crops germinate.

Ukasi Women FGD

I don't know. We don't know because, nothing has happened that we can associate with the reduced rains.

Ukasi Watch

ii. Vegetation and physical barriers

... we have no mountains and huge trees to cause rain
..... destruction of traditional shrines of Ithumbi hills;
....felling of trees, no growing of trees

hand in destroying shrines, mainly particular trees located on hills which traditionally acted as sites of religious rituals. This is a pointer to social meanings whereby climate is embedded in the cultural values and norms of a society (cf. Hulme 2009:1-34). Absence of high altitude land-forms such as mountains is also viewed as contributing to the disappearance of rain clouds. In addition, most people view vegetation cover, specifically trees, as playing a central role. Trees are regarded as a regulator of temperatures and playing a role in soil moisture retention. The cutting down of trees and lack of adequate replanting is therefore viewed as contributing to the hot and dry spells as well as not providing a barricade to slow the winds that carry the clouds away. The linkage of trees to climate is an interesting indication of local knowledge and raises the question of how it comes into being. Further observations in the study area indicate that the discourse of trees has a long history associated with external interventions. Chapter 6 explores how this tree discourse has become popular with the local people.

The localised view of causes of perceived changes in weather are also shared by other researchers (Ofuoku *et al* 2011; Meze-Hausken, 2004, Tscakert 2007). Ofuoku *et al* (2011:67) whose study which focused on the Delta State of Nigeria, established that Nigerian farmers related weather changes mainly to soil degradation and intensive agriculture. In Tschakert's (2007) study, deforestation and agricultural over-exploitation were voiced as the causes while Manyatsi *et al* (2010) work in Swaziland pointed out breakdown of traditions and super natural powers as cause for changes in climate and weather.

These general findings on geographically localised perceptions of climate provide the insight that climate variability or change is or will be perceived in its local manifestations, or individual risks, and that adaptation to associated climate risks will be shaped by these manifestations. In order to track the impacts of climate risks on households' well-being, the next section discusses how households are affected when less or no rains are received.

5.2 Impacts of climate risks on households' well-being

The dry spells are characterised by high day temperatures. These are experienced not only through the drying of vegetation but also through their direct impact on people. Babies are said to develop rashes in the hot seasons. Households' field labour is planned around the day's varying temperatures. Most of the household chores are undertaken in the early mornings, between 6am and 11am, and late afternoon, 4pm-7pm, as the heat around midday makes working in the fields difficult. As a group discussion elaborated:-

> "We go to the farm very early, so that the hot sun does not get you on the farm. Like me, I am normally in the farm by 6am. By 9.00am I am out. We rest – either, return to the house or if the farm is far, you rest right there until the heat reduces, then you continue till 17 or 18hrs before returning to the house."
>
> *Ukasi FGD*

People's response to high temperatures is evident not only in the design of houses but also in their dressing. Houses are mainly constructed with high walls, leaving a large gap between the roof and the lintel area to allow for air circulation. Residents wear mainly open shoes convenient for walking and working under high temperature conditions. But it is the variability, irregularity and uncertainty in precipitation levels that provoke the greatest challenges to households and consequently their well-being. The ensuing shortage of rain water directly impacts on availability of domestic as well as soil water for vegetative growth. The productivity of crops and livestock pasture is lowered leading to reduced crop yield and productivity of livestock. These in turn have consequences on food security, income security and social cultural values played by livestock.

5.2.1 Adequate and clean domestic water

With low pipe water connection rate (11% of survey respondents) in the rural areas, rain water is hailed as the most accessible for all. Domestic water uses include drinking (both humans and livestock), cooking and washing. Droughts result in not only lack of rain water, but also drying up of waters in river beds and dams. Water in open dams turn brown or green as evaporation increases and concentration of non-water elements increase thus posing health hazards. Ground water is also said to decrease due to reduced recharge from rains. This compromises households' ability to access adequate and safe domestic water. Households spend considerable time and energy to acquire water for domestic use. On a dry/drought season, water is sourced as far as 24 kilometers away compared to 5 kilometers on a normal season (see table 11 below). Provision of clean and safe domestic water has therefore been a focus of many external interventions by government and humanitarian organisations.

Table 11: Average distance to water sources in Mwingi region

	Seasonal rivers	**Rock Catchment**	**Shallow Wells**	**Traditional Wells**
Normal season	2-3 km	3 km	1-2 km	2-5km
During droughts	4-7km	12-30km	8 km	8-24km

Source: Arid Lands project - Drought monitoring bulletin Jan 2011

5.2.2 Food and livestock wealth crisis

The amount, the timeliness and the length of the rainy season define quality of crop harvest and livestock pasture. A change in any of these therefore limits or enhances crop and live-

stock production. As a region largely dependent on rain-fed cultivation and livestock keeping as mode of production to support livelihood, reduced or no rains at expected seasons triggers an undesirable spiral effect: inadequate rains result in low or no crop harvest and livestock pasture; low harvest and little pasture means less food for humans and emaciated and reduced livestock herd sizes due to deaths; and consequently desperation in efforts to bridge households' food and income gaps. Indirectly, food and income from sale of crops and livestock is curtailed prompting households to get into a crisis mode of food acquisition from the market. Panic sales of livestock increases supply which culminates in low prices. With less value than ideal, the households then have to purchase food supplied from other regions at exorbitant prices, a process that leads to gradual erosion of their assets. These observations were variously captured during the field work:-

> During the recent drought, livestock started dying because without rains there is no pasture. People and livestock faced famine. One had to buy all foods from the market – both for humans and livestock. Maize stover and cabbages used to come from Kikuyuni (Central Kenya). Food was very expensive. The prices of the cattle were also very low.
>
> *Migwani FGD*

> When there is no rain, there is no harvest and there is no income from the farm. The little money that is there is diverted to purchase food.
>
> *Mwikali78*

Adequate rains, rains that optimally support crop and vegetation growth reverse the negative spiral effect to a desirable well-being. Indeed, *Ukambani* in general, is known for bumper crop harvests in good rain seasons. After the drought of 2008/2009 which had been declared a national disaster, there were good rains resulting in a bumper harvest and healthy livestock herds, a time that coincided with the fieldwork period of this study. Photos 3 and 4a/b below capture these healthy maize plantations as well as livestock, while providing contrast with the dry/drought season while photos 5a/b capture the drought scenario. Excess crop harvest is sold to cater for non-food household needs as well as converted to livestock as an alternative store of wealth.

But it would be misleading to singularly link good rains with good crop harvest and food sufficiency. The short rains of Oct-Nov-Dec 2011 for instance were presumed adequate for crop production but as of January 2012, many households had lost the hope of a harvest particularly of maize and cow peas due to destruction of the crops by stem borers[47]. The menace pest is said to have caused tremendous damage to crops diminishing any hopes of a reasonable harvest. Other factors that determine crop performance and harvest include the types of planting

[47] Stem borers are larvae of some moths, that bore into the stems of a growing plant especially maize and sorghum

materials used. During the short-rains 2011 season, a non-governmental organisation distributed free maize seeds for planting. Those who planted reported complaints of the failure of the maize plant to bear. They observed that the maize variety had vigorous vegetative growth but very small maize cobs, an indication that the planting material may not have been the most suitable one for the region. Such experiences have likelihood of eroding confidence of the local people and their willingness to reach out for extension services.

A similar verdict of crop failure is experienced as some households plant the maize they buy from the shops for consumption, which is normally grown from different agro-ecological area, thus unfit for the drylands. Although hybrid planting materials are available in the shops, their relatively high price vis a vis many competing households needs inhibits their utilisation. Fertiliser application among other farming inputs remains low – it is estimated that in the Eastern lowlands, of which Mwingi is part of, less than 50% of farming households use fertilizers (Ariga *et al.* 2008:15). The limiting financial capacities also affect post-harvest management as stored cereals are not treated and end up being contaminated by aflatoxins or destroyed by pests (Kimani 2011).

Physical characteristics of the soils, that have little to do with the amounts of rains that fall, also play a role. The typical sandy soils of the region have low water holding capacity that allows quick loss of moisture and soil nutrients through leaching. This characteristic is aptly observed by the local households:-

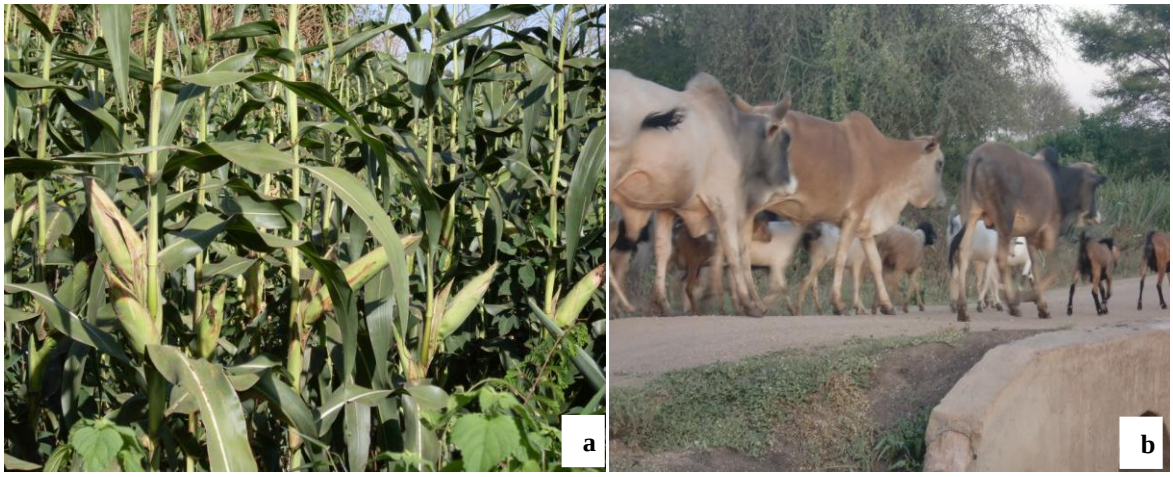
> On most of the farms, the crops have started withering. On hard soils, the crops have started withering (*imeanza kulala*). Here we have white soil - which is hard, and there is another that is sand-like, which keeps/retains water - this one supports crops better because of being able to retain water.
>
> *Ukasi Women FGD*

Since cultivation is primarily for subsistence, low harvest affects households' ability to cater for its food needs, a gap that is filled by sourcing food from the market. Livestock on the other hand are the store of wealth and are sold to cater for households' financial needs. They are also the medium of exchange in marriage relations (see box 8). Any reduction in the quality and quantity of livestock has a direct effect on the household income as well as social values.

From the foregoing, it is evident that climate enters people's lives through the occurrence of drought and its impacts on access to domestic water, food, income and socio-cultural values. Based on Sen's capability approach, four core household functionings, i.e. beings and doing that make life valuable, that are impacted by climate risks can be extrapolated. These are: being able to produce food, being income secure, being able to conveniently access water and being able to secure social status. In the next section, the practices households undertake in

pursuance of these functionings threatened by climate risks are explored. Five categories - mobility, storage, diversification, markets and communal pooling – are considered as being constitutive of the capabilities to achieve the households' four functionings identified above.

Photo 3: The secretary general of the Kenya Red Cross and Mwingi South MP visit Mwingi to witness a bumper maize crop – Jan 2010



Photos 4a/b: Crops and livestock during a rainy season

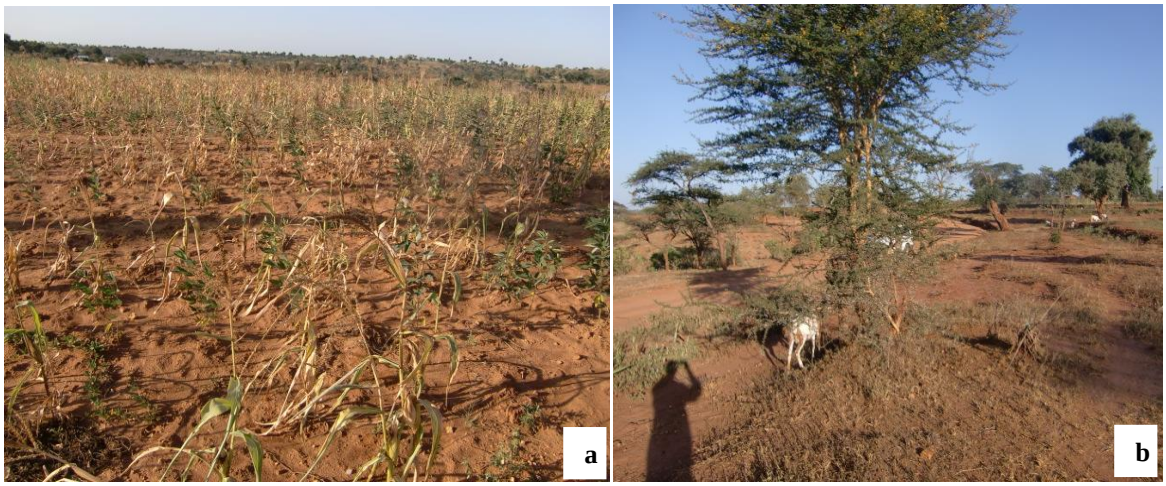


Photo 5a/b: Crops and livestock in dry/drought season

5.3 Upholding households' well-being – adaptation practices

The foregoing discussion has identified households' functionings that are impacted by climate risks, specifically drought. It is through being able to produce food; secure income; conveniently access water; and secure social status, that the well-being of households is affected by climate risks. The capabilities - the set of actions possible to uphold households' well-being (Sen 1999), exemplified by the four elements of well-being, is the focus of the following discussion. These possible actions are presented through the capabilities of mobility, storage, diversification, market exchange and communal pooling.

5.3.1 Mobility of livestock and people

Movement of people and/or livestock are the most common forms of the capability of mobility in many drylands regions. Although the mobility of livestock can easily be linked to spatial and temporal availability of pasture and water, drought as a climate risk may not be the sole motivator of mobility of people. Yet it cannot be ignored when it comes to pursuance of household well-being in the context of climate risks. As predominant agro-pastoralists, households alternate cultivation land with grazing land. The bigger the overall piece of land owned by a household, the bigger the proportion under livestock keeping. Given that land tenure is mainly under private ownership, there is little movement of livestock from the individual households land holdings in a normal season. In a dry or drought season however, spatial differences in pasture and water availability in the region does motivate temporary movement of livestock. This is done in two ways: i) a livestock herd is split and some or all distributed among relatives residing in areas with relatively more pasture; ii) moving the livestock temporarily to the hills which comprise communal lands (trustlands) or protected areas. A respondent narrated how he benefits from the kinship relations during drought:

> "Last year, I took two cows to my in-laws in Nuu. They would graze and milk the cows. I gave them the calf that was born. Since it rained, I collected my two cows. If they had remained here for long, they would have died...so we help one another like that..."
>
> *Kamuwongo Kasim*

The main dry season grazing zones include the Nuu hills, Mumoni, Endau hills as well as Kola national park which are protected areas managed by governmental institutions - Kenya Forest Service and Kenya Wildlife Service. Entry into and grazing in the protected areas is generally prohibited. However, in cases of extreme drought, there are negotiations with the respective authorities for controlled grazing. Such a window of cooperation is guarded with caution especially on the side of the authorities. On one hand, clashes occur between the communities that bring their livestock – particularly Kamba and Somali pastoralists. On the other hand, the local communities are observed to take advantage of entry into the protected areas by harvesting trees for charcoal production, which they sell to supplement their cash needs.

Livestock movement as one of capabilities of mobility thus provides for survival of livestock herd in the face of climate risks experienced through drought and consequently contributed to achievement of two funactionings - being able to secure income, and being able to maintain social status in the society.

Labour migration of one or two members of the household to other areas or towns is a common strategy for supplementing household income well-being. From the household survey, 28%[48] of the women who participated in the interview indicated that their husbands were away from the rural homesteads for work in Mwingi town. Other popular labour migration destinations include Nairobi, Garissa and Mombasa. The nature of this mobility is either temporary or permanent. Many of the members of households without advanced technical skills obtain temporary contract works, normally manual work which provide wages to meet households' needs through cash. They then return to manage their farms when the rains return. A respondent in Ukasi narrated how he was able to sustain his family during the 2008/2009 drought through casual labour in the city:-

> You cannot sit here and wait. So I went to Nairobi in 2007. I worked as a manual worker in a construction site. I came back to the farm towards end of 2009, when it started raining here to help in land clearing. Now I have been busy planting.
>
> *Ukasi Mwanzia*

Those who migrate more permanently are those with technical skills and manage to acquire longer term work contracts such as teachers. Labour migration as a form of capability of mobility thus contributes significantly to a households' achievement of the functioning-income security in the face of the climate risks. This functioning of being income secure consequently links to achievement of the other household functionings. This is mainly through regular remittances of food and cash. While cash is used to cater for food and non-food needs such as school fees, it is also used to acquire household assets such as cattle to build up the household herd. From the monthly bulletins prepared by the Arid Lands project, it is estimated that an average of 20% of the Mwingi rural households receive remittances from their members living outside of Mwingi. Notable however is that even though these members, normally males, are not present on full time basis at the homestead of the household, they are part of the decision-making of the household (see more details in section 6.3.2).

5.3.2 Storage

The capabilities of storage were observed to entail storage of domestic water, soil moisture optimisation, storage of food grains as well as storage of livestock fodder. These options of storage attempt to secure optimal availability of domestic water, food and livestock pasture across drought and non-drought periods.

[48] This percentage may appear low given the popularity of labour migration. It may have been occasioned by the planting season. When it rains, those who migrate for temporary work outside of the region return to help in the planting.

i. Domestic water

Rain water harvesting is vital to all households given that piped water connectivity is limited (see table 11). It is the desire of households to harvest and store as much water as it has rained. However, although majority of households (80% of survey respondents) have corrugated iron sheets roofed houses, only a few of these are able to harness the rainwater using gutters. Cooking pots are used to collect the dripping water which is then emptied into the 5 and 20 litre jerricans. Only 6% of the survey had water tanks[49]to store the water. Installing a large size water tank or replacing a thatch roof with iron sheets means allocation of money and this has to compete for scarce financial resources with other household needs such as food and education.

The other alternatives to harnessing rainwater are the communal points such as dry river beds, earth dams, rock catchments and sand dams. In the case of river beds and sand dams, water is obtained by digging shallow holes into the river sand (see photo 6). As the dry or drought season lengthens, so does the depth of the water holes due to lowering water table necessitating search of shallow locations farther on where other alternatives are not available. Earth dams and rock catchments utilise topographical characteristics to store run-off rainwater.

An alternative to rainwater is ground water which is accessed through sinking of shallow wells and boreholes. While shallow wells are dug by individual households, boreholes, earthdams, sand dams and rock catchments are capital and technology intensive, thus demanding external interventions by government and non-governmental organisations.

Households, and more specifically women and children, walk an average of 2-5km to access water. As illustrated in figure 12 below, the distance to water source increases during the dry seasons and decreases shortly after onset of rains as water points recharge. Donkeys which take up the burden of carrying are a crucial household asset particularly for transportation of water.

[49] Water holding vessels with capacity of 200litres or more

Table 12: Rural households by most common source of water

	Pond (earth-dams)	Stream	Well/ Borehole	Piped into Dwelling Unit	Piped water Kiosks	Water Vendor
Mwingi*	2,504	18,256	17,837	299	4,702	1,493
Kyuso**	1,483	12,970	10,226	42	1,369	303
Mwingi Region Total	**3,987**	**31226**	**28063**	**341**	**6,071**	**1,796**
%	**6%**	**44%**	**39%**	**1%**	**8%**	**3%**

Source: National Population and Housing Census 2009

*. **: Data was recorded after Mwingi district was split into two: Mwingi and Kyuso districts.

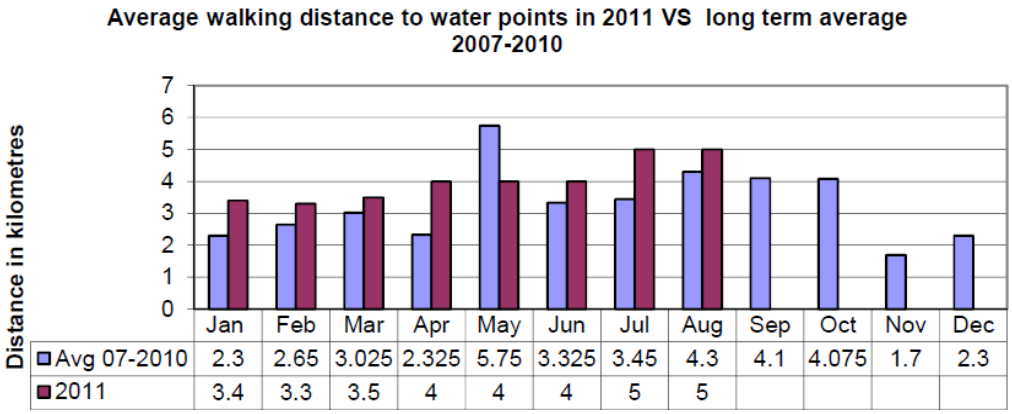


Figure 12: Average distance to water points at different periods of the year

Photo 6: Fetching water from a dry river bed *Source: Author*

ii. Soil moisture optimisation

Numerous soil, water and crop management practices are employed in order to retain as much rainwater in the fields as possible and/or to make the most out of the available water. Two main strategies are practiced: soil and water conservation as well as choice of crops and sowing pattern.

Soil and water conservation

Bench terraces are a landscape marker in Mwingi (see photo 7 below). They have been adopted by all households to varying degrees. Also popularly known in Kiswahili language as *Fanya juu* terraces, they are used to reduce slope gradient, slow down run-off and allow sediment deposition as well as water infiltration. *Fanya-juu* literally means, "do-up" and it refers to the way the soil is thrown up the slope from a ditch to form an earth embankment or bench. When several of these terrace benches are made across a field, on the contour, over time, the land between the benches levels off. Soil and rainwater are conserved between the benches.

Photo 7: Bench terraces in Mwingi West *Source: Author*

Choice of crops and sowing pattern

Crops that yield with minimal precipitation – drought-resistant and crops with short growing period – drought escaping find favour in the study area. All households plant varying quanti-

ties of the drought-resistant sorghum (*Sorghum bicolor*), millet (*Millet disambiguation)* and cowpeas (*Vigna unguiculata).* Sorghum and millet are traditional grains used for making breakfast porridge. Households reiterate that even with the worst of droughts, unlike with maize crop, one can never fail to harvest though the amounts may be sub-optimal. Cowpeas leaves are the staple green vegetables for the local population, in addition to the pulses used in the local *Muthokoi* dish, a mix of boiled maize and cowpeas or beans.

Green grams (mung bean, *Vigna radiate*), a pulse considered as drought escaping due to its short growing period of three months is however planted by few households and is regarded as a cash crop. Its unpopularity is due to its intensive labour and inputs demands. It is said to require intensive care including use of chemicals which have to be procured from the market. Harvesting it is also said to be tricky – a delay of one week can result in big losses as the pods burst releasing the legume seeds. Due to their small nature, it is difficult to collect what spills down. The crop is thus cultivated only by a handful of households and only in small quantities.

Households are aware of the erratic and inadequate nature of local rains. They attempt to forestall likely losses through staggered sowing pattern. While land preparation in readiness for planting is done slightly before the rains, planting itself is staggered. Land to be cultivated is divided into portions. One portion is planted before the onset of rains. Subsequent portions are planted after observation of the behaviour of the rains. If the period between one rainy day and the next is not long, planting is undertaken until the cultivated piece of land is full with crop. If the next rains come after a month since the onset, then farmers become more cautious. Having grains for too long in the soil invites attack by birds which remove and eat the grains from the soil. Inadequate rains can lead to total loss of the plant material in addition to the labour that will have been invested. Staggered planting therefore cushions households from incurring these losses. Photo 8 below captures land preparation by use of ox-driven plough.

Photo 8: Ploughing land after the first rains in March 2010 *Source: Author*

ii. Storage of food grains

A survey undertaken in Kyuso, which is part of Mwingi region, by Catholic Relief Service in 2007 established that grain storage was undertaken by about 41% of the households for a period ranging between one and fifteen months. Traditional granaries were the main method of storage. Pests, poor storage and diseases were noted as the main causes of post harvest losses, leading to upto 90% loss of value of the stored grains (Bett and Nguyo 2007:1025).

iii. Storage of livestock fodder

Although there have been interventions to support households to store excess fodder available during the wet season, the practice has not taken root. In the 90s and early 2000, the then German Technical Cooperation (GTZ) facilitated a few farmers with training on fodder management. The Arid Lands Project was also, at the time of this study, engaged in campaigning for fodder cultivation and storage. A visit to one farmer who participated in the programme revealed that the knowledge for fodder management still existed and indeed, this particular farmer was making efforts to grow and store pasture grass. But he lamented that it was not

easy to "teach" his neighbours the practice. Cross checking with respondents in another area, sentiments denigrate the efforts. Some respondents complained that the work was tedious and since many households owned large herds of cattle, it was inconceivable how they could accumulate enough pasture for them. In their perspectives, it was easier to let the livestock graze and browse to their fill while the pasture lasted.

5.3.3 Diversification

The capabilities of diversification aim to support households' well-being through contributing directly and indirectly to achievement of all the four household functionings threatened by climate risks. Options in diversification aim to minimise or cope with losses resulting from impacts of climate risks. In Mwingi, they comprise strategies for alternative water and income sources, diversification of livestock, crop varieties and production methods.

i. Rain water for domestic use

Other than communally accessible water points such as sand-, rock catchment- and earth-dams and boreholes, some households dig their own wells. Private wells are however few due to the high cost of sinking them. Of the household survey, only 6% has private wells.

ii. Crops

All households in Mwingi cultivate crops to varying degrees. All households grow more than one type of crop in varying proportions of the land – as mixed cropping or mono-crops. A typical farmland will have some maize, cow peas, pigeon peas, hyacinth bean (*Lablab purpureus*), sorghum, millet, green grams and beans. They diversify their crops for a variety of reasons. While maize is favoured as a stable food, sorghum, millet, cow peas and pigeon peas are chosen for their ability to yield even with minimum rainfall. On the other hand, green-grams are popular as a source of cash crop, hardly consumed by households but sold for money. Popular fruit trees include mangoes and papaya.

Diversification in crops also exists in forms of intensification of inputs such as use of irrigation and fertilizers or management of the post-harvest value chain such as processing, storage and marketing. Although small-scale irrigation is touted by households as a feasible practice to circumvent the dependency on rain water for cultivation, its adoption however remains very low and basic. Of the 17% of household survey respondents who indicated practicing some form of irrigation, almost all were doing it at a micro scale, mainly growing vegetables for subsistence (see some irrigated farms in photos 9 & 10). Water from shallow wells or from river was ferried in jerricans and applied on crops using a watering can. Two respondents

were using kitchen waste water to run a kitchen garden. A few others were using inverted 1-2 litre plastic bottles to water fruit trees.

Some of the observed post-harvest management initiatives observed during the field work included processing of mango juice and papaya marmalades as well as grading and packaging of green grams. The extent of adoption of these practices is based on membership to groups (see discussion on communal pooling). In the case of fruits, the practice is seasonal as the fruits are also only harvested on seasonal basis. Sisal, which performs well under low precipitation and is commonly used as a live fence fits well into the craft industry. The Kambas are renowned for their skills in carving and basket weaving. Basket weaving is particularly very popular in Migwani and Tyaa areas (Mwingi West) where there is plenty of sisal. A Community-Based Organisation (CBO) has even set camp in Migwani to support the women (as basket weaving is the preserve of women) in value addition and marketing of sisal baskets (see Photo 11 & 12).

There are also emerging crops that have become the focus of value addition. Aloe vera, which has in the past been growing in the wild without much exploitation, is now promoted as a drought resistant plant that makes a valuable input into soap-making. Numerous women groups have been trained on aloe vera soap-making.

Photo 9: An irrigated onion farm along Tana River in Thaana Nzau *Source: Author*

Photo 10: Wanzumu vegetable growers group draw water for irrigation *Source: Author*

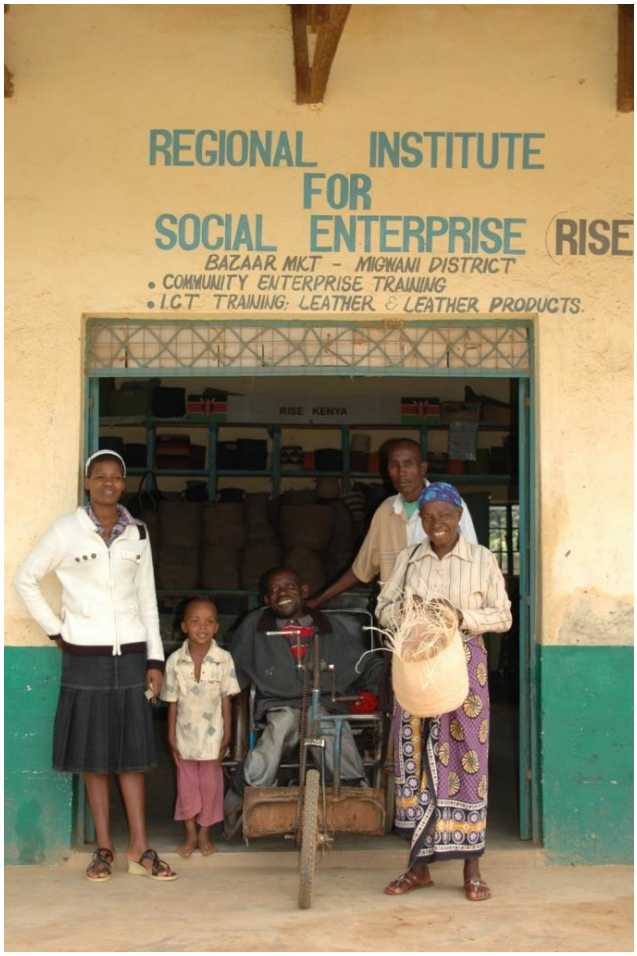


Photo 11: Local enterprises - outside the offices of RISE
Source: Author

Photo 12: Local enterprises - inside the offices of RISE *Source: Author*

iii. Livestock

Diversification is also extended to livestock. Livestock keeping is regarded as security against crop failure. Households keep a mixed herd of livestock, comprising of cattle, goats, sheep and donkeys. Goats are the predominant livestock species - every household that has livestock has goats. Bulls are highly valued due to their use in pulling the plough during land preparation for planting. They are also marketed for meat. Normally a household will have more bulls than cows, on average one or two milking cows for provision of household milk. The predominant breeds are the Boran and the East African Zebu, which perform well compared to exotic breeds which are reared in high potential agricultural areas like central Kenya. Sheep are not however preferred though owned by a few households. There exists a cultural belief that keeping sheep or eating mutton reduces one's protection against witchcraft. Small livestock like chicken are also found in almost every homestead and are normally owned by women. In table 13 below, a random sample of 5 households is used to capture the livestock mix owned by households.

Generally, household livestock belong to the head of household, normally the man. Women can own smaller stocks such as goats and chicken. Men have the overall decision-making power for sale of livestock unless in cases where a woman is the sole owner. But even in such cases, the man can still decide on the disposal of the livestock against the wishes of the woman. Some women have however learnt how to circumvent the ownership and decision-making challenge by "hiding" the goats from the knowledge of their husbands by placing them with friends and relatives.

The households recognize the differences in the feeding habits and preferences for different plant life forms by different livestock species. Cattle and sheep are grazers preferring grassland, while goats are browsers and prefer bushland. A mix of the livestock therefore ensures not only efficient use of land but also survival and availability of a broader range of animal products. In a focus group discussion with local households, participants made comparisons between cattle and goats. They reiterated that goats can feed on a variety of pasture, both graze and browse, while the cattle survive on grazing. In addition, they noted that goats easily climb steep slopes in search of pasture, while cattle, due to their size and weight cannot climb such areas. When it comes to market, goats are easy to sell compared to cattle since they are of less cash value. The donkey is also a vital species of the household livestock as it is a source of labour particularly transport. Women use donkeys to fetch water from far off dis-

tances. Households acknowledge that cattle are the first animals to get affected once a dry spell or drought sets and pastures start to diminish.

Table 13: A sample of livestock ownership by 5 households

	Ownership of livestock						
	Bulls	Milking cows	Calves	Goats	Sheep	Donkey	Chicken
HH1	8	2	0	5	0	2	6
HH2	2	0	0	6	0	1	20
HH3	2	1	0	21	0	1	5
HH4	5	0	0	27	0	2	0
HH5	3	2	2	7	0	1	14

Source: Household survey

Beyond the farm-based activities are income diversification strategies whose performance is not directly climate-dependent. A small fraction, 16% of the study household survey indicated having engaged in non-farm income generating activities particularly small trade, in addition to running the household farm. These were normally households living not very far from the small shopping centres in the study area. A shopping centre would comprise a couple of shops offering consumer goods and services such as sugar, salt, tea leaves, mobile phone charging and shoe repair.

In a nutshell, households in Mwingi employ numerous strategies under the capabilities of diversification. These strategies range from diversifying: sources of water beyond dependence on rains, crops, livestock across different feeding needs as well as undertaking non-farming activities. All these contribute in varying magnitudes to achieving households' well-being of accessing water, self-food production, income and social status.

5.3.4 Market exchange

The capabilities of market exchange available to households in Mwingi entail sale of local crop produce and livestock. These options are undertaken as a general practice on a normal season. During drought, they are undertaken either through distress or as a strategic action. As a general practice on a normal, i.e. non-drought season, going to the market place to sell local farm produce as well as obtain alternative replacements for what is not produced on farms provides an option of supporting households' well-being. Sale of crop harvest is undertaken for small household cash requirements. Livestock are only sold if there is an urgent financial need –e.g. to pay school or college fees for a child. Minor household financial needs are met by selling crop harvest since this is easily divisible.

During a drought season, distress and strategic sales of livestock are undertaken. Distress sale of livestock occurs when water and pasture become scarce and animals start to get emaciated. For fear of losing the animals through death by starvation and not by choice, households take them to the market for sale. Not all households, however, are victims of distress livestock sale. There is evidence of deliberate risk management effort through market exchange. Some households on the onset of the dry season sell off their already fattened cattle and replace them with goats. This strategy aims to reduce risk of loss while maintaining total livestock value. Goats are regarded as hardier during dry and drought conditions. In photo 13, the researcher interacted with Mama Mukiomo who had sold a bull to replace with goats on that market day. It was a household agreement to replace the bull with goats as there was expectation of a dry spell that could become a drought.

Generally, larger livestock, although belonging to a household, cannot be disposed off without authority of the head of the household, normally a husband, irrespective of whether he is a resident or working in some town outside of the rural home. Women are however allowed to own and solely make decisions on whether to sell and what to do with the money. A large stock like a bull is sold when there is a needy case like taking a child to a secondary school.

Photo 13: Mama Mukiomo with her new purchase of goats - April 2010 *Source: Author*

5.3.5 Communal pooling

Mobility, storage, diversification and market-based capabilities of enhancing household well-being tap to varying degrees social capital resources embedded in communal pooling. According to Agrawal (2010) communal pooling involves sharing as well as collective mobilisation and use of resources. In Mwingi, communal pooling is practiced at two levels – at family level and at neighbourhood level. At family level, households that are related by blood or marriage share or combine resources. A respondent from Kamusiliu narrated how his household and others in his extended family manage to store rain storm water:-

> "Then I mobilised my family. We contributed money and gave people to dig it. I was the one who would be given money and coordinate the work. Then I noted that the dam would fill in one or two rains. So I decided to dig another one right next so that I would capture the over flow. That is my personal one. At weekends, my children, wife and myself, and my brother neighbour, on Saturdays, we would gather there and dig the dam. In the morning, I would go and dig a little. That is where the GTZ found me (Sic.), with the family earth dam."
>
> *Kamusiliu FI*

Distant kinship relations also provide a form of risk insurance across spatial locations. When one area is affected by drought more than others and livestock pasture diminish to the extent of threatening the survival of the herd, one searches for his kin in other regions with pasture

and gives away part or whole of his heard. The arrangement is that if there are milking cows, the hosting household would benefit from the milk. In case of goats, kids born are shared.

> My wife comes from Mumoni. During the drought season, we take some of our livestock there. There is grass in Mumoni hills. Last year, we took two cows. One gave birth and they would milk. When it rained here and the grass was available, we collected the cows. That is how we live."
>
> *Kamuwongo BG*

Communal facilities such as earth dams, rock catchments, sand dams and boreholes are run collectively through water management committees. Self-help groups, comprising of voluntary membership are a common feature of Mwingi and are involved in a variety of activities from labour sharing particularly clearing of land and making bench terraces to pooling financial resources to support one another. In deed self-help groups are an entry point for many external interventions in Kenya – they are discussed in more detail in Chapter 7.

5.4 Conclusion

This chapter sought to understand households' perceptions of climate and impacts of climate risks on their well-being. Through the perspectives of Sen's capability approach, the chapter sought to identify the functionings (doings and beings that make life of the rural people of Mwingi valuable) that are impacted by climate risks, specifically drought. Additionally, the chapter sought to identify the capabilities that households deploy in order to achieve the identified functionings under threat by drought impacts.

In exploring the perceptions of climate, the study sought to establish whether the local people differentiate between climate and weather and the changes thereof. It was found that there was no distinct or significant difference in the way the two were perceived. Indeed, as stand-alone terms, they were found to only exist in the English language while in Kiswahili or the local tongue, Kikamba, one term describes both the long-term as well as the short-term weather conditions. The difference is only discernible in the temporal description – the "weather of this place" to mean the long-term average, and the "weather of last year" to denote shorter term weather conditions.

As a drylands region, climate variability is not new to Mwingi. An inquiry on whether the local people already perceived climate change received mixed reactions. Respondents claimed change and further cited changes they had experienced in the last five years or so. The concept of change in their perspectives does not therefore conform to the science of climate change in temporal standards. Their perception of change referred to a comparatively short period of time and was linked to hardships experienced during recent extreme weather condi-

tions. Precipitation was the main climate element featuring in local people's description of changes in weather. Drought and rainfall were the representation of absence and presence of precipitation. Droughts hence spell the main climate risks that local people experience and live with. There was therefore no significant difference between the way the people of Mwingi perceived climate variability and climate change; instead, drought was the clearly perceived risk, irrespective of whether it was from "change" or "variability" of the climate. This conclusion confirms the hypothesis that households perceive climate through the role of weather in their livelihoods, that climate change or climate variability are only theoretical categories whose differences get blurred in real life-worlds of local people. This is grounded on the observation that approaching the field through the discourses of "change" and "variability" appears to be subjective and does not elucidate objective or coherent responses. Perceptions of change are closely linked to memory. Yet, memory is a poor reflector and tool for discerning and distinguishing climate change and variability as it is influenced by a myriad of non-climate factors such as time, age, extension support and macro market factors of liberalisation.

The chapter also explored the impacts of climate risks and specifically impacts of drought to the well-being of the people of Mwingi. It was established that drought impacts resulted into three forms of crisis - domestic water crisis, food and livestock wealth loss crisis. The high dependence on rainwater means that in drought periods, there is little water accessible for domestic use, for crop and livestock pasture growth. These crises then affect critical household functionings namely: being able to produce food through substance farming, being financially secure – by acquiring money from sale of crop produce and livestock, being able to achieve a social status in society – by owning large herds of livestock as a form as cultural stock of wealth and being able to pay dowry (see Box 8 for cultural value of livestock). For adaptation debates to be meaningful and relevant to households, they must be able to link closely with these functionings. This means that they cannot afford to seclude themselves to focusing only on the direct characteristics of climate risks and impacts.

Agrawal's (2010) categories of adaptation practices proved useful and sufficient to capture the strategies households use to circumvent the impacts of droughts. These, using Sen's capability approach, correspond to capabilities of mobility, storage, diversification, markets and communal pooling. Capabilities of mobility entail livestock movement as well as labour migration. Those of storage consist of rain water harvesting, soil moisture optimisation and storage of livestock fodder. Capabilities of diversification consist of source or storing water

through different modes, diversifying crop varieties and cropping patterns, diversifying livestock across differentiated feeding needs and undertaking non-farm income generating activities. The capabilities of market exchange during drought were observed to take two forms – distress and strategic sale of crop produce and livestock. Communal pooling capabilities were observed at two levels – family and neighbourhood levels. All these capabilities are available to households to uphold their well-being. This confirms the utility of employing an inclusive methodological approach rather than an exclusive one.

It is observed that the capabilities go beyond the realm of climate studies to spill over into development arena meaning that debates of adaptation should not be "silo-rised" as a preserve of climate experts. It is therefore plausible to support the claim that the goal of adaptation as a process, in general, need to be seen in the context of upholding households' ability to produce food, secure income, access water as well as secure social status in society. Specifically, the goal of adaptation has to be set and evaluated against its ability to expand the range and effectiveness of capabilities that households view as valuable in upholding their well-being in the face of climate risks. This would serve two conceptual challenges: the burden of proof that adaptation are indeed formulated with climate risks in mind considering that the households have to deal with multiple stressors; and whether people are adapting to climate change or variability.

Having explored how households perceive climate, identified the nature of well-being of households affected by climate risks, and the capabilities available to the households to uphold their well-being in the face of climate risks, the next chapter explores the factors that influence choices of alternative capabilities as well as constraints to optimal deployment of the chosen capabilities.

CHAPTER SIX

THE SPHERE OF CONTEXTUAL VULNERABILITY

THE ADAPTATION ENVIRONMENT

6.0 Introduction

The chapter engages the sphere of contextual vulnerability to explore the conditions under which households choose and operationalise the mix of adaptation practices (alternative capabilities) to uphold their well-being – hence the adaptation environment. Emphasis is laid on conditions that influence the choice or dominance of particular practices (i.e. preference formations) as well those that constrain deployment and/or realisation of optimal potential of the practices. The chapter focuses on the study question - under what conditions do households choose and undertake adaptation practices? The guiding hypothesis in discussing this question is that adoption of adaptation practices is best understood through analysis of broader context of socio-economic and historical settings as well as cultural milieu embedded in the politics of general development, disaster risk reduction and humanitarian interventions in the region. It is concluded that a household's choice, ability to take up and the level of effectiveness of adaptation practices while an independent household decision and undertaking, cannot be detached from these broader socio-economic, cultural and institutional elements. The chapter therefore analyses these conditions and explores their linkages to households' choices and constraints to adaptation practices.

6.1 Socio-economic setting

This section seeks to understand the socio-economic conditions under which households choose and operationalise adaptation practices. The conditions are observed to be enmeshed with actions and inactions of structures of administration of development and humanitarian interventions. Transport, energy and water supply infrastructure as well as market access are analysed as goods and services that are vital constituents to the household adaptation practices. Conditions of market access, credit and food aid provisions are reviewed to seek their role on household adaptation choices and ability.

6.1.1 Infrastructure

There are numerous critical support goods and services that influence the extent to which households choose and attempt to optimise different types of adaptation practices. During the field work, observations and notes were taken on the most discernible and conspicuous ones.

Road transport network, energy and water infrastructure were observed to be the most glaring public goods linked to households adaptation activities.

i. Road Transport Network

Roads are the main mode of transport facilitating movement of people and goods within Mwingi region. Their accessibility status influence the ability of households to harness adaptation practices of mobility and markets while curtailing diversification through increase in costs of production. Although Mwingi has numerous roads, it has only one all-weather-road, the Thika-Garissa road, which is tarred. Areas with low density population such as Tseikuru and Ngomeni have limited road network. All other roads are earthen and prone to damage particularly during rains. During heavy rains, the earth roads get muddy and impassable. The top soils of the road are also eroded leaving rough rills and gullies that make driving difficult and contribute to high rate of wear and tear of vehicles. Photos 14 and 15 below capture the state of roads – one during a rainy season and the other during a dry season.

Photo 14: A road in Kamusiliu, Mwingi after a rain season

Photo 15: Ngomeni-Tseikuru Road, Mwingi during the rainy season

During a transect walk in Kamusiliu village, members narrated how vehicles never reached some sections of the villages as roads became impassable during the rainy seasons. People had to walk long distances with luggage on their shoulders or backs. Those who could afford would hire motor cycles to help ferry the goods. A bus ticket from Mwingi to Tseikuru costs Ksh200 (approx. €2), a distance of 80km, and takes about two hours. Public service vehicles are available mainly in the mornings and evenings. Mwingi-Nairobi road, a tarred route of almost 300km costs Ksh350 (approx. €3.50) and takes three and half hours. This comparison

shows how disproportionately high the internal cost of road transport is. It is 42% more expensive to travel from Mwingi town to Tseikuru town than travel from Mwingi to Nairobi, despite Tseikuru being only ¼ distance compared to Nairobi.

In a women focus group discussion in Mumoni, the challenges posed by poor road network and roads conditions were linked to maternal health risks. For these women, accessing basic health care was hindered by the nature of the roads. Giving an example of emergencies related to child-bearing, the group members asserted that women bore life-threatening risks due to the status of roads.

Challenges to an accessible road network in the region thus bears direct impact on the cost of movement of people, goods and services consequently limiting market access and increasing cost of living and cost of agricultural production. Inaccessibility locks out villages from market circuits exposing them to exploitation by middlemen who can mobilise their own transport to roam around the villages with 4-wheel-drive vehicles (see also section 6.1.2 on market access). The deficiencies in conditions of road network point fingers at central government over resource allocation. Maintenance of road infrastructure is the responsibility of the Ministry of Public Works with allocation of resources from the central government. But at the highest level of decision-making and resource allocation, the Parliament, it becomes blurred as to where responsibility lies, as parliamentary discussions indicate cracks in resource management but puts responsibility on no specific institution. Inadequate and discriminate allocation of funds for this purpose is a perennial problem as captured in a complaint by the local political representative in a parliamentary debate. Even at this high level of decision-making for resource allocation, unprocedural criteria appear to still carry the day.

> "....Mr. Speaker, it is very clear that Mwingi district has got only two constituencies. If for the three years (*1998-2001)* the council graded 500km and 480km were graded in one constituency, "which is not more senior" than the other – only 20km were done on the other constituency. It is very clear that something is very wrong! ...These tractors stick in several other districts where there are senior ministers and members.....and that is not the only area..."
>
> *Republic of Kenya 2001:1470*

The overall effect of difficulties presented by the status of roads can thus be linked to capability of households to harness mobility and markets as adaptation practices, while also curtailing efforts of diversification through increase in costs of production.

ii. Availability and affordability of energy

Boreholes and shallow wells are ground water sources that supplement rain water in Mwingi. Diesel water pumps were used to pump the water out to storage containers. While boreholes are co-managed by government and local communities, digging a shallow well is a private undertaking. However, community groups with a member who owns a shallow well can get assisted to acquire diesel water pumps to facilitate access of irrigation water. Groups involved in agricultural produce value addition activities such as processing of mango juice operate electric mango-pulp-making machines. The machines are provided to groups that can access electricity. Conversely, only community groups with a reliable energy source would come forward with a proposal for an activity that is energy-intensive. Alternatively, the machines are located in the urban centres and group members have to access them from there. Availability and affordability of energy not only for provision of water for domestic use and irrigation but also for facilitating different forms of livelihood diversification cannot be underrated.

Electricity provision in Mwingi is precarious. Less than 1% of the rural population is connected to grid electricity not only because it is prohibitively expensive to install but also due to its non-existence. Until 2009, even Tseikuru, the home town of the country's vice president (Jan 2008 until early 2013) and a district headquarter, did not have electricity. Electricity infrastructure is confined to urban centres, only dotting the rural settlements as *en* route transmission lines. Although this study does not delve into quantification of foregone benefits in the context of adaptation practices through accessible and affordable electricity, it does recognise that such a form of energy would open up more efficient operationalisation of households' desired adaptation practices particularly those relating to diversification.

The alternative form of energy for running machines in Mwingi is diesel. However, cost of diesel remains a challenging factor. It is considered high and has been increasing over the years. The price is not only a factor of global oil prices but also of distance from the main pumps at the main urban centres – Mwingi, Kyuso and Tseikuru as transportation costs are factored in the selling price to consumers. Parallels can be drawn from data on prices of paraffin which were available to the study. Over a period of 5 years (2007-2011), paraffin prices experienced steady increase (see box 4, table 14 and figure 13) based on the global prices and macro-economic performances. This increase does not appear to be commensurate with the inflation rate over the same period. On the whole, this makes the rural setting unattractive as it cannot support a wide variety of diversification activities. Due to high operational costs, there are instances where water pumps provided to community groups are kept in store due to

members' inability to purchase diesel. At the time of field work, the motorised water pumps allocated to Mukuluni self-help group was not in use due to inability to purchase diesel to run it.

The implication of lack of accessible and affordable energy on households' adaptation practices can also be viewed from another remote but imperative perspective – link between the rural and the urban setting. Mwingi town for instance, being the largest urban hub in Mwingi region hosts a multitude of services that rely on availability and accessibility of energy. These include commercial banks, warehouses, hotels and even organisations' offices such as district headquarters and NGO offices. Enterprises such as banks will shun centres that increase their operational costs without much reciprocating returns on investment, thus directly making it far more expensive for the far flung rural households to access their services.

Under-provision of electric energy and ever rising prices of petroleum-based fuels limit households in the types of adaptation practices they can engage in. Energy-intensive options such as agricultural produce value addition with motor-driven machines or irrigation using machine-pumped water are a preserve of households living in proximate distances to the electricity grid or those that can mobilise support from the government or NGOs.

Box 4: Change of price of kerosene between 2007 and 2011

The average price has been on the increase in the last couple of years. Between January 2007 and December 2011, the national average retail price had increased by 61% from, KES56.75 to KES91.58. Kerosene fuel pump points are few, located in the town of Mwingi and from 2010 in Tseikuru and Kyuso, perhaps due to the low household purchasing power combined with low population density. Local merchants in the rural areas have to transport the fuel from the pump stations and store in drums for resale to households in quantifies as small as 200ml, a practice referred to as the *Kadogo Economy* - translated as the economy of small amounts. In statistical figures, the sum expended per unit is normally higher than if the unit was purchased in bigger quantities given that traders have to add their profit margins based on the additional transportation and repackaging costs.

Table 14: National average price of kerosene: 2007-2011

Month	National average retail price of kerosene: 2007-2011 (in Kenya Shillings)				
	2011	2010	2009	2008	2007
Jan	78,45	62,27	68,00	64,37	56,75
Feb	80,47	62,2	65,94	66,66	56,14
Mar	84,92	62,36	63,26	66,94	55,99
Apr	91,91	63,19	60,25	68,81	56,13
May	93,57	65,18	58,27	74,30	56,97
Jun	86,66	65,6	57,99	75,45	57,21
Jul	87,11	63,98	60,19	80,95	57,32
Aug	89,81	64,53	59,75	84,95	57,58
Sep	89,14	67,32	59,73	84,52	57,58
Oct	90,79	67,77	60,47	82,61	58,6
Nov	95,71	69,5	60,78	81,11	59,66
Dec	91,58	74,12	61,08	71,10	60,82
Annual Inflation Rate	14.0%	4.1%	10.5%	16.2%	4.3%

Source: Kenya National Bureau of Statistics – www.knbs.or.ke
http://www.knbs.or.ke/sectoral/cpi/cpi_inflation_trends.html

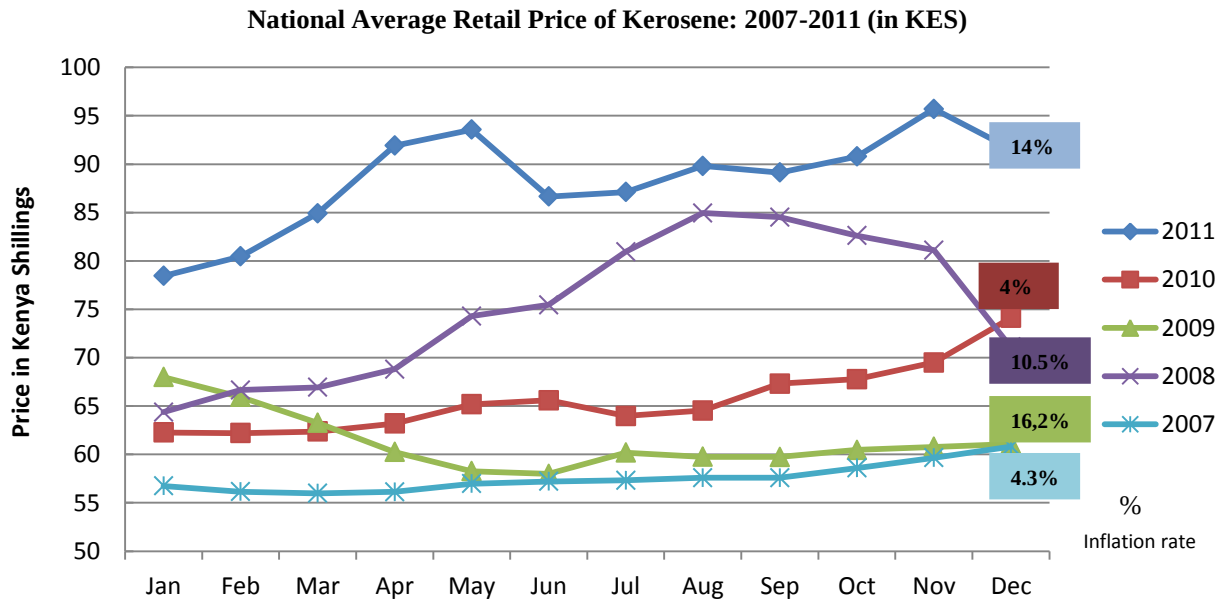


Figure 13: A trend analysis of the national average price of kerosene: 2007-2011

iii. Water supply

In many instances, it is the business of every household to cater for its domestic water or even irrigation water needs. Other than rain water collected in homesteads, other sources of water remain largely inaccessible or unreliable – for instance the average walking distance to water points is 2-3 km on a normal season and 4-7km on a dry/drought season (see table 11). Mwingi has low coverage of piped water supply, most of which is confined to towns with a connection of only 1% of the rural households (see table 12). The Kiambere-Mwingi Water and Sanitation Company which is mandated with the provision of and rehabilitation of piped water network, laments of difficulties in accessing remote areas. It claims that efforts to increase piped water supply is limited by prohibitive costs, estimated at Ksh175 (approx 1.50€) to provide one cubic litre of water (Frame Consultants Ltd/Tanathi Water Services Board 2011:8).

Piped water is also availed in communal water kiosk in some village centres, from which surrounding residents come to collect water in jerricans. Having the water kiosk or water tap still does not guarantee availability of water. Water disconnect due to non-payment of electricity bills (for pumping water) are common as the institution responsible is unable to meet its financial obligations. In the first two months of this research's pilot study (December 2009 and January 2010), the Town Council of Mwingi's electricity connection which supports water pumping in the region had been disconnected due to an outstanding electricity bill amounting to Ksh5 million. The town residents were supplied with Tyaa river waters delivered with donkeys. The piped water can only be used for domestic purposes and does not even suffice. It is therefore allocated in shifts among regions of Mwingi.

About 39% of households in the region rely on water from wells and boreholes while 44% source water from the streams – dry river beds and sand dams. A small percentage of households, 6%, source water from earth dams and rock catchments. In emergency cases of severe water shortage, water is supplied through water tankering with priority given to hospitals and schools. Statistics on the quantity and quality of water infrastructure is difficult to obtain. Neither the Ministry of Water and Irrigation Services, the TANATHI Water Services Board or NGOs, all who contribute to water provision in the region, can account for the current status of water infrastructure. A request for a map of water initiatives at the government water office was unsuccessful as the office itself did not have historical records of its works let alone that by the NGOs. Changes in administrative boundaries as well as dysfunctional infrastructures were cited as some of the complications of producing an up-to-date status of water supply

interventions. Since the change of the national government in 2003, Mwingi region has witnessed splits of administrative regions, a decision aimed at ensuring proper and efficient management of areas based on population and spatial area size. In 1992, Mwingi District was carved out of Kitui District. It was split into two in 2007 to form Mwingi and Kyuso Districts. Later, in 2009, four districts were created from the two, making a total of six: Mwingi East, Mwingi West, Mwingi Central, Kyuso, Mumoni and Tseikuru. The good intensions of "bringing services closer to the people[50]" has not however been matched with the requisite human and administrative resources needed for the running of districts as stand-alone planning and administrative units. The Ministry of Water therefore remains stretched to perform its mandated duties as an expert interview respondent narrated:

> One big problem we have here is low staffing. The ideal staffing should be 15 staff in the three sections: 5 in planning, 5 in ground water and 5 in operations and maintenance. Now we have less. We have 6 districts that we have to serve and we have to share the resources. In Mwingi West for instance, there are only two staff in the Ministry of Water. Only Mwingi Central has a vehicle, the rest of the districts do not.
>
> *Mwingi DWO*

A coordination challenge antagonises water infrastructure provision. Numerous actors, governmental and non-governmental are engaged in water resources management, depending on their mandates. For instance, the Kenya Forest Service or Ministry of Agriculture will fund sinking of a borehole to support establishment of a community tree nursery. The multiple efforts harness synergy of funds and expertise. When an actor mobilises financial resources for water provision, they link up with the Ministry of Water for technical expertise of water engineering works. However managing the cooperation is not always a smooth process. A ministry staff noted that transparency particularly of financial resources is contentious, perhaps due to fear of Government agencies attempting to make demands not initially planned by NGOs.

> The NGOs consult our office. When I write my monthly progress report I have to include this information. But there are some NGOs which do not want to disclose some of their work especially their budgets. Yesterday we went to a project and I asked how much the project cost and they did not want to declare.
>
> *Mwingi DWO*

The existing sources of water have varying difficulties of availability and accessibility. Amount of rainwater stored in earth dams and rock catchments is reduced by high evaporation during the hot dry season. In his opinion;

> Everything here is challenging. Everything depends on rainwater harvesting. Even rain water harvesting has its own challenges - because the temperatures are very high, the humidity is very low, hence a very high level of evaporation.

[50] A popular government rhetoric for rationalising creation of new administrative units. In reality, political motivations are normally behind the splits.

Mwingi DWO

The Ministry of Water hosts an evaporation pan in its compound, a facility that is ideally planned to enable calculation of rates of water evaporation for application in planning open-air water storage facilities. However, according to the expert respondent, managing data collection and interpretation has been interrupted by internal reform processes making the Ministry unable to fully perform its duties smoothly;

> We do not have current data from the evaporation pan. Since the water sector reforms, almost everything has gone in disarray. In some stations, the small meteorological stations which we had were relocated to other areas like schools, farms,...every change comes with its advantages and disadvantages. So when it comes to data collection especially on met (*meteorological data)*, I can assure you that we are really backward. Before, we had a section purposely dealing with that, but that was 10 years ago. Funding remains a challenge.
>
> *Mwingi DWO*

The earth dams are also prone to damage from flash floods in the wet season. The efficiency of earth-dams as modes of water harvesting thus remains elusive due underground seepage as a result of the permeable nature of sandy soils as well as high surface evaporation due to the high temperatures in the region.

Sand dams are located on the river beds while rock catchments capacity depends on the availability and size of rock outcrop. Given that rains are normally unpredictable and low, these three techniques of rain water capture and storage are not a guarantee to predictable perennial water access even for domestic use let alone for irrigation. The alternative is ground water, which is availed through sinking of boreholes. Due to their capital intensiveness, they are a preserve of government or humanitarian organisations. Reliance on ground water is met with the challenge of salinity and uncertainty in depth where water can be found. Indeed there are cases where boreholes have been sunk, and no water is reached, or water is reached but ia saline or gets depleted after a few months and does not recharge. The water administrator thus noted;

> Ground water in Mwingi is tricky. Since I reported in this office one and a half months ago, we have sunk three boreholes. At least one got some water - about 3 cubic meters. The other two boreholes were totally dry....So water availability is a big problem. I was going through the borehole records we have in the office, and I found that most of the boreholes yield less than 5 cubic meters per hour. Others produce salty water which can only be given to livestock. It is not suitable for cooking.
>
> *Mwingi DWO*

The current status of water supply has two observable implications on households' adaptation practices. First, due to insufficient water supply, search for water remains a core task for households. Time and financial have to be allocated for its acquisition. It also implies that the amount of water available is prioritised for domestic use to meet basic feeding needs. Water-

intensive adaptation practices such as diversification of farming from rain-fed to irrigation is an option that is not available or is limited. It was not until 2012 that there were deliberate plans to provide irrigation water in Tseikuru.

Second, with challenges of inadequate water supply by responsible governmental bodies, a water supply vacuum is created. Since domestic water is part of basic human needs and its inaccessibility threatens life, its limited availability and/or accessibility to households attracts numerous philanthropic interventions. NGOs facilitate sinking of boreholes, digging of earth dams and installation of rock catchments and sand dams (see photos set 16). Though noble initiatives, the result is an uncoordinated mosaic of water infrastructure without clear priority criteria on where and when the facilities are installed. Given the sensitivity of domestic water needs, even government ministries are able to raise donor funds to install the same kind of water facilities the NGOs do. For instance, the Arid Lands Project, implemented by the Ministry of Northern Kenya and other Arid Lands, is also involved in sinking boreholes and digging earth dams. While these initiatives meet emergency and immediate needs of domestic water, the feasibility of a comprehensive and harmonised water provision programme through which small and big scale water interventions can be channelled remains unexplored. But if indeed this was a gracious strategy, how come it is not pursued? And what has this got to do with households' adaptation practices? Some plausible explanations may be sought by reflecting on some implementing actors' interests.

In Mwingi, most of the stand-alone water infrastructures are supported by NGOs which obtain their resources from donors. Many donor projects are short-term, lasting one-two years. An NGO applying for funds thus has to demonstrate its impacts within this period. A physical infrastructure is a clear way of doing this as it can be easily accounted for and meets a clearly demonstrable need. What are missed out are the "software" structures that are necessary part of running the "hardware" physical structures. These include proactive engagement of the local households where a facility is located, to nurture local ownership and participation. This would entail involvement of costs whose benefits cannot be demonstrated in a short period. In addition, NGOs would prefer their independence in implementation of activities as much as this is feasible. Working hand in hand with government institutions seems to slow activities due to the bureaucracies involved. An expert informant from ADRA indicated experiences of cooperating with the Ministry of Water:

> "We have our own work plans with deadlines to meet. Sometimes on the Ministry side, they don't do their part. ...sometimes they come for meetings late. Their procurement procedures take so long. So we prefer to do it. But we still have to involve them since they have the technical expertise."

KI6-ADRA

For the NGOs, being able to implement their projects independently enables them to satisfy the mandates they commit with donors while making a difference albeit small to the local communities they serve.

The NGOs are not the only organisations involved in provision of water infrastructure. Government ministries and even individuals such as politicians are also involved. The small infrastructural units create fertile grounds for corruption to thrive particularly within government system. A forensic audit[51] of the Arid Lands Project undertaken in 2009, covering two fiscal years 2007-2008 highlighted suspected fraudulent expenditures amounting to Ksh 362 million or 29% of expenditure reviewed in sampled 7 out of 28 project districts. The report cited the large amount of relatively small transactions managed at district level as the opportunity exploited to siphon project funds which occurred through fabricated, inflated or invalid expenditures (World Bank 2011).

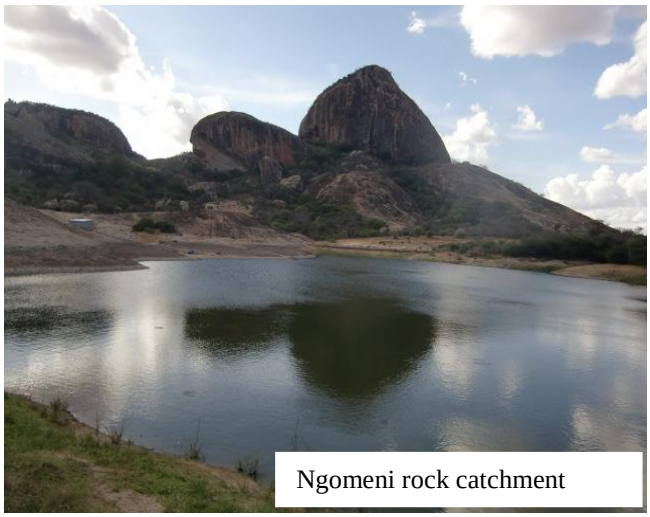
In Nguni area, the local people had participated in the preparation for construction of Kyangu earth dam. But what they got is far less than what they had been made to expect, making them suspicious of lack of transparency in the operation. A member of the dam committee reiterated that:

> The National Water and Pipeline Conservation intention was to dig a big dam but only a small one was built. The chairman (*from the area)* was weak (*he was compromised- alikuwa chairman wa kuwekwa kwa mfuko).* Not all funds allocated were spent on the dam. The people got a smaller dam than what was on paper.
>
> *Mzee Kimwe, Kyangu earthdam*

The popularity of politicians thrives when they engage in undertakings central to the people such as water projects and food aid. Engagement in easily visible small infrastructure projects such as a water pipeline, a bore hole or an earth dam, raises their profile as the local people are promised or reminded of these projects at election time. In a water piping inauguration event at Kyethani village, scores of women danced praising the local politician for his good deeds (see photo 17). The wrapper fabrics they had on their waists were a donation from the politicians bearing the words "*meko"*, meaning "action" printed on them. This was a clear reminder of who is facilitating and helping the local people to access facilities so basic.

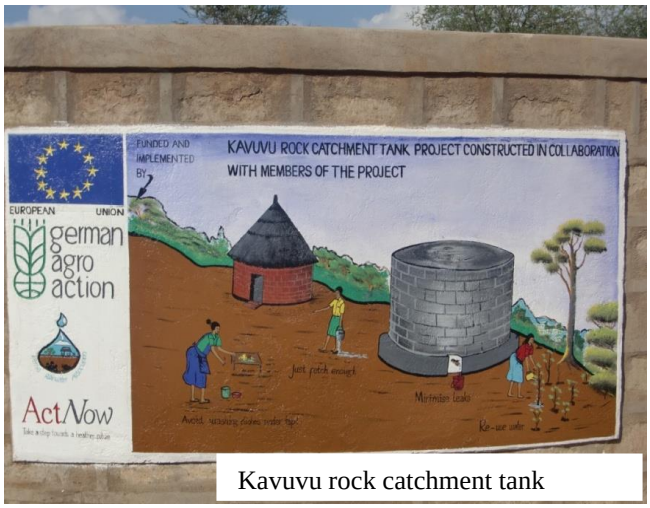
[51] INT The World Bank Group Integrity Vice Presidency. Forensic Audit Report Arid Lands Resource Management Project phase II. Redacted Report. July 2011

Limited availability of water curtails households' time as well as financial resources as they have to either buy the water or invest in private projects such as shallow wells. Households are also limited in how they can grow crops: rain-fed versus irrigated agriculture. Only those along the Tana River have an option of irrigation since they can use the river water. But this could perhaps be only an overt perspective of understanding the linkage between the status of water supply and adaptation practices. It would mean that solutions lie in increasing resources in order to increase the density of the water infrastructure and consequently make water accessible to households. While this is pragmatic and important, it is also vital to recognise the arena under which existing status of water supply is practiced. It is an arena marked with camouflaged interests which keep the partakers active in water supply. A window of chance to focus on a comprehensive and harmonised water provision is thus blocked.



Ngomeni rock catchment

Kalimbui borehole



Kavuvu rock catchment tank

Kyethani piped water project

Mutunga sand dam

Kamusiliu earthdam

Photo set 16: Various water infrastructure projects *Source: Author*

Photo 17: A local politician inaugurates a water kiosk at Kyethani village, Mwingi West district

Source: Author

Figure 14: A cartoonist's impression on the discovery of oil in Turkana, an arid area

Source: *The Daily Nation* 27 March 2012

6.1.2 Market access

Households produce crops and rear livestock not only to meet subsistence needs but also raise money to meet non-food needs such as school fees, clothes, medicine and assets such as bicycles. In addition to selling labour for wages, small enterprises such as running kiosks, soap making, basket making are established to augment the household income. A supportive and conducive environment is critical if households are to optimally benefit from adaptation practices that depend of market exchange. A focus on market conditions for crop harvest, livestock and local enterprises initiatives illustrates this importance and point out the constraints.

i. Market for crop produce

Maize, pigeon peas, green grams, sorghum, millet and cow peas are the main farm produce that are traded. In a few areas, cotton is also grown as a cash crop but in insignificant amounts. Formally structured trading options are offered by Ministry of Agriculture and the National Cereals and Produce Board (NCPB). On market[52] days, a household may decide to take a portion of its crop produce to the market. Alternatively, brokers drive through the villages to buy the harvest.

The Ministry of Agriculture has been making efforts to support farming households to access fair market prices for their produce. This is facilitated through formation of farmer clubs for individual crop produce. For instance, in Mwingi West, where most crops perform well due to relatively higher rains than in other areas of Mwingi region, there are mango clubs, greengram clubs and tomatoes clubs. Through these crop-specialisation clubs, farmers are facilitated not only in production management but also in marketing. Two examples with indications of success include branding of *Mwingi Ndengu* (Mwingi green grams) and *Gadam* sorghum. This type of sorghum is used as a substitute for barley in beer making.

At the time of field work for this study, the Ministry had negotiated a memorandum of understanding with World Food Programme (WFP) for purchase of greengrams and sorghum from within regions of Mwingi that produced surplus. WFP mobilises and brings together food from around the world for distribution as food aid. Sourcing food available locally has been hailed as a positive gesture towards addressing spatial imbalances in food availability.

For *Gadam* sorghum, an agreement was made with the largest brewing company in East Africa, the East African Breweries Ltd. This is important because sorghum is able to sustain a

[52] The markets under the market-days notion, comprise mainly of open air trading spaces in designated centers

harvest even in the driest of seasons[53]. The strategy involves promotion of the *Gadam* sorghum as a cash crop and linking farmers with guaranteed markets and even prior negotiated prices. A logistics company, *Smart Logistics*, takes the responsibility of collecting the sorghum from the villages. Individual farmers are organised into small groups in order to consolidate their harvests as well as provide a focal cluster for purposes of agronomic training by the Ministry. Payments to the farmers are made via mobile phones through *M-Kesho*[54] accounts of Equity Bank, a financial institution that is nationally renowned for setting its business focus on the mythically perceived "unbankable" poor masses. As a positive side-effect, the process has assisted local residents who did not have bank accounts, because they did not have anything to bank, to join the banks and can now access credit to buy farming inputs. The initiative by the Ministry of Agriculture is therefore applauded by farmers though it may still be too early to celebrate its achievements given that the marketing structures have only recently been put in place. The Ithumbi Farmer Field School narrated their experience with the sorghum;

> Here we have about 1 acre for the group and we have divided the farm for different crops. Currently we are testing the growth rate of sorghum – we plant in a little depression with manure, and in another section we plant normally. All that we grow is market oriented. We are planting *Gadam* for the first time. We are always in contact with the Ministry of Agriculture officers -sometimes we go to them, sometimes they come to us.
>
> *Ithumbi FFS*

The National Cereals and Produce Board (NCPB) is a governmental agency with the core mandate of buying farmers' produce. It is a state corporation under the Ministry of Agriculture, formed in 1979 and supported by a 1985 Act of parliament. It has the responsibility of promoting free and fair trade in agricultural commodities and ensuring their timely accessibility back into the public market. Central to its roles is commercial grain trading, maintenance of strategic grain reserves and procurement, storage, maintenance and distribution of famine food aid to deficit areas. However, its performance and effectiveness is far from satisfactory.

As of 2009, the NCPB had 110 silos in the whole country. Mwingi region hosts 2 NCPB depots – one in Mwingi town and the other in Kyuso town. Here, local farmers can deliver their grain produce, normally maize, at a fixed price pre-determined based on prevailing demand and supply conditions. Ideally, NCPB provides a feasible option where local households can sell their grain produce after a bumper harvest and therefore escape the middleman exploitation. This however is not always the case. Complains abound questioning the accessibility of

[53] In the household survey, respondents were asked to give reasons as to why they chose to plant a particular crop. Sorghum was hailed for its ability to produce a harvest even with extreme dry/drought conditions

[54] This is a recent innovation of accessing and managing ones funds on mobile phones

NCPB. Corruption, bureaucracy and delayed payments deter local farmers from delivering their grains thus living them at the mercy of the grain brokers. Insights and intrigues of NCPB came to fore during an informal chat with a young man of about 24 years who sells fresh fruits and vegetables in a makeshift shack along the Mwingi town main road – see Box 5 below.

Box 5: Intrigues of accessing NCPB

Mutuku runs a makeshift fruit and vegetable stand in Mwingi Town, along the Mwingi-Garissa road, on a small space between the Kenya Commercial Bank and Equity Bank. I buy some fruits and then engage him in some small talk. He informs me that his fresh fruit business is not doing well and he is looking out for other opportunities. I enquire of the nature of opportunities that he is after. He says he could try his hand on anything that would offer him an income. During this period, he is assisting a local policeman to collect maize from farmers in the villages. The policeman pays him Ksh100 (approx. 1€) for every bag he delivered. He has an order of 600 bags. Within a month, the period within which he hopes to have finished collecting the maize, he will have earned Ksh 60,000 (approx. 600€), a good sum by all means. He is buying the maize at Ksh1,000 per bag from the farmers. The policeman will sell the maize in bulk to the NCPB at Ksh 2,300 (approx. 23€) per bag. The lorry carrying his maize does not have to queue at the depot, because he is "known". Those who are not "known" queue longer or have to experience delaying tactics such as claims that their maize has high moisture content than required and has to be dried for a couple of more days before being accepted by NCPB.

Extracted from field notes

Corruption is not the only factor that keeps NCPB out of reach for local farmers. The convenience of access and speed of payment are the other factors. Given that the local farming system is largely subsistence, households sell varying amounts ranging from half a bag[55] to several tens of bags. Households calculate their costs and benefits of delivering their produce to the NCPB. One needs to hire transport means to deliver the maize. In case the maize is not accepted by the NCPB at the hour of delivery, the transport owners continue to charge fees for every hour of delay. The uncertainty of guaranteed attendance at the NCPB becomes an inhibition. Delivering half-a-bag or one bag of maize from 100km away on a rough road is not an attractive venture. Furthermore, the NCPB does not pay cash on delivery. It can take as long as three months.

The result is that households are forced by these circumstances to take the seemingly convenient means of selling their crops – to the middlemen who move from village to village with their own transport collecting even the smallest of amounts and pay cash for the transaction. For this convenient market access, the households trade off with an offer of very low prices and they are aware of it. The plead for farmers to not sell their farm produce at low prices

[55] A bag normally weighs 90kg

immediately after harvest hence goes unheeded. They argue that children's school needs and other household needs have to be met. The "be wise - don't sell your harvest" pleas ignore these circumstantial needs of households by framing the local people as short-sighted, as was expressed by a district administrator:

> We are announcing in *Barazas* (public meetings) that people should not sell their harvest when the prices are low. I have told all my chiefs and sub-chiefs to pass this message around. This is how the people end up with famine. They sell all the food at harvest and then suffer later. They buy the maize again when the prices have gone up. They don't think about tomorrow.
>
> *Kyuso District Admin*.

> The biggest problem is the fluctuations of weather. But in addition, we have an administrative problem because there is no ready market for our produce. For instance last Dec-Jan, we harvested a lot of maize. But the brokers were buying at 10 shillings per kilo. NPCB were buying at 23 shillings but they do not pay cash.
>
> *Migwani FGD*

The weekly market places which serve as meeting points of buyers and sellers are an alternative to circumvent the challenges of the NCPB and brokers. On Mondays, the market is in Nguni, Tuesday in Kamuwongo and Ukasi, Wednesday in Mwingi town, Thursday in Tseikuru and Mui, and Friday in Migwani, Ngomeni and Katse, and Saturday in Nuu. These market points serve as venues for exchange of goods from within and out the region. Goods mainly brought in from other region include household edible and non-edible items. Given that these markets are rotational, taking place in 10 major market centres of Mwingi, they are attractive in terms of access. But the economic laws of demand and supply do not work in favour of the local households. After a rainy season and harvesting, the supply of food stuffs in the market increases, pushing down the selling price and consequently the amount of money the households can make from the sale of their produce. The reverse is repeated during a dry or drought season - households go to the market to buy food stuffs coming from other regions, and with demand outstripping supply, the prices increase. In combining the two scenarios – in the first case, households receive less than fair prices while in the second one, they give up more, a trend that eats into or reduces potential for savings or building of assets.

> When we plant, we hope to make good sales of the harvest. But this does not happen. In the market, the prices are very low. Even when you sell one bag, the money is not enough to cover the household financial needs e.g. soap, school fees, sometimes the children have to drop out of schools.
>
> *Ukasi FGD*

ii. Livestock

The situation is not very different when it comes to trading with livestock. In the rotational market centres, a section is reserved for livestock trading. An individual who wants to sell or buy chicken, goat or cow comes here. The market is formally unstructured - for the seller,

you buy an entry ticket from the county council official who man the market entrance, then proceed in to take your stand where willing buyers pass by, inspect your *good* and bargain the price (see livestock market place in photo 18).

Again, the law of demand and supply applies - when the supply is high, the prices dip; when the supply is low, the prices go up. The supply of livestock in the market is to a significant extent in tandem with the nature of rains and the amount of pasture available in the region. Livestock grazing pastures diminish with reduction in precipitation. Continuous back-to-back dry seasons strain households' food supply and crop-derived income and necessitate disposal of livestock to feed the families as well as cater for other needs. Households are well aware of the market problem, as the Migwani focus group expressed;

> So our biggest problem is ready market and middleman exploitation and we cannot manage to avoid them because even if it is the cattle, you cannot take two cows to Dagoretti[56]. So a middleman gives you three thousand shillings and goes to Dagoreti to sell the same cow at fifteen thousand shillings. He collects cattle from several people. What I need is money - my child has been sent home from school, so I am vulnerable to being exploited. ..... we need arrangements for livestock marketing - it will help us.
>
> *Migwani FGD*

The Kenya Meat Commission (KMC) is the government corporation designated to purchase livestock and resell in form of meat. However, it is unable to satisfactorily play this role. Touted as "one of the worst cases of mismanagement of state corporations" (Mogusu and Kathuri 2006), and its conflicting aspirations to provide both buyer-of-last-resort welfare services to pastoralists and to make a profit, KMC struggles to get back to its feet after it reopened shop in 2006 following a 15 years period out of operation (McSherry and Brass 2007).

Lack of guaranteed, organised and regulated markets for principle households' produce thus conceives uncertainty and jeopardises market exchange as an adaptation practice. The alternating erosion of households' wealth is a precarious vicious cycle that cannot be broken by for instance growing more of drought resistant crops as would be espoused by mainstream adaptation studies.

With formal marketing structures entrenched with bureaucracy and corruption, the effectiveness of market exchange as an adaptation practice is compromised. Households have to choose between two "undesirable" market options – whether to take their produce to NCPB and KMC or to middlemen. Either case leaves them as the losers.

[56] Dagoreti – this is the largest private livestock slaughterhouse in the country, located in Nairobi

Photo 18: Livestock market place in Mwingi town

Source: Author

iii. Local enterprise initiatives

To supplement household food and income, households engage in a variety of farm- and non-farm based enterprises. Farm-based enterprises mainly entail value addition of farm produce. Mangoes are processed to make mango juice, *Aloe vera* is processed to make soaps and shampoos, sisal is decorticated for ropes and basket making, honey is refined, packaged and labelled. The common non-farm enterprise is running a consumables[57] shop at the local shopping centres.

Most of the value addition enterprises are facilitated and initially funded by government and non-governmental organisations through provision of training and seed capital assets[58]. Through the Arid Lands Project, numerous community groups have been supported in enterprises such as bee keeping and honey processing, greenhouse farming, mango processing,

[57] Such consumables include salt, sugar, cooking oil, soaps and detergents, sweets, writing books and pens etc

[58] Capital assets are assets that are used to contribute to a business ability to generate profit. In this case, capital assets include mango pulp making machine, water pumps and generators, sisal decorticator etc.

Aloe vera-soap making. The Regional Institute for Social Enterprise (RISE), a local NGO, has specialised on organising and supporting women groups for basket making and marketing.

Majority of these local enterprises target the local population with their products. Members of a group share out the products amongst themselves and sell them around their locality. The general wealth condition of these localities however influence what and how much of these products is taken. In dry or drought periods, household income is constrained as items that are ordinarily obtained from the farm have to be bought. Expenditure of household income has thus to be prudently managed, a process that involves cutting down on some items. Products such as mango juice, honey, or aloe vera soap have high chances of not featuring in the priority list.

Enterprise initiatives that target a market catchment outside of the locality have an upper hand. But meeting quality demands of customers has its own pressures. In a discussion with members of RISE who had in the course of 2009-2011 hit the news headlines with claims of large export sales of baskets, it was apparent that many of the women had to make many pieces of the baskets with only a few passing the export quality test. In a gathering where they were dying the sisal threads, they shared their successes and tribulations;

> We started in March last year with training. In June, we started interacting with external clients, who would look at our work and appreciate it. The first order was in July by a lady who had a Chinese client. We did it successfully and made some money.....
>
> ..some of the baskets are not sold. We are told they did not fit the requirements. You see, like the discs, we would make so much but only a few were selected for sale. ....it is a challenge. We are being trained how to carefully meet the requirements when weaving."
>
> *Women group - RISE*

The effectiveness of local enterprises as a form of adaptation through diversification and market exchange is determined by the general wealth conditions of the localities in which they are undertaken. Poverty levels, which are approximately 60% translate into low performance of these enterprises. As the women in Ukasi expressed it:

> When you start a business, it is also problematic because people don't have money so that if you start a shop or a hotel, you strain very much. You can stay a whole day in a shop with good stock but you sell very little. Even a hotel, if you go round here, you cannot get more than two hotels where you can get food. Majority only make tea and *Chapati* because that is what is cheap that people can afford.
>
> *Ukasi Women FGD*

6.1.3 Financing adaptation

Adaptation practices especially those relating to diversification and storage require injection of financial capital for their potential to be mobilised. These finances are sourced from a household's savings or through credit from friends, relatives or financial institutions. Households however persistently cite lack of finances as one of the hindrances to undertaking adaptation practices. Box 6 below captures some of these sentiments that respondents had on pasture harvesting and storage, water harvesting and storage.

Box 6: Financial hurdles to meeting adaptation costs

"I only pray that I can get money to buy a machine for cutting the fodder. I think I would do better that even now..."

Mzee Mkonzo

"Those gutters are not even in my priority list. I know it is important, but money for that is not available. The river is down here, I take the donkey and go to the river. I am interested in digging a well, but I don't have the resources.

Kanini Musunza

"(...) in future, I will look for the manual pump for pumping the water and a tank. The only problem is money.....one can take a loan, but one needs to have some personal capital. You cannot take a loan when you have nothing else in your pocket. And once you cannot pay, they come and collect everything else you own.

"Secondly, the problem of what to do with that money. The enterprises that one can start cannot repay. For example, you take a loan and buy mangoes... and sell them for 5 bob...in the end it is not enough to repay the loan).

Muthuri Kanini

Those who have roofed their houses with corrugated iron sheets can use gutters to collect water. But many houses here are roofed with grass - so when it rains, the water flows away and you just have to follow it down the river beds. But not all houses have gutters. Money to buy containers or construction of tanks is not there.

Ukasi Women FGD

Against this backdrop of seemingly lack of finances to support adaptation practices, the study took note of presence of a large number of self-help groups[59] that engaged in micro savings and credit activities and numerous micro-finance institutions in addition to presence of four commercial banks, three based in Mwingi town and one in Kyuso. To probe how and why financial resources were cited as a constraint to adaptation practices in the milieu of a wide range of formal and informal financial institutions, a deeper look was sought on the perceptions of and experiences of households with these financial institutions. The enquiry was nar-

[59] Between 2001 and 2007, some 1,358 self-help groups were registered with the Ministry of Gender, Children and Social Development; many others operate without official registration.

rowed down to accessibility of financial resources from formal micro-finance institutions. The engagement of finances from rotational micro-credit and savings groups was considered too low for capital-intensive tasks like buying pump machines as the amounts saved are generally small.

Micro-finance services (MFS) have been part of the development toolbox since the last couple of decades and comprise delivery of loans, savings, insurance and other financial services to the poor so they can engage in productive activities, helping them build assets, stabilise consumption and protect themselves against risk. Micro-finance initiatives in general aim to fill a market gap left open by traditional commercial banks, which have been unwilling or unable to effectively provide financing for the poor. Micro-credit in particular, operates on the principle that the poor cannot get loans from traditional banks because they do not have the collateral to secure the credit (Hammill *et al.* 2010:114). In Mwingi, formal micro-finance services, particularly micro-credit have been a widespread initiative by governmental and private profit-making institutions.

The Ministry of Gender, Children and Social Development has since 2007 been running a "Women Enterprise Fund" aimed at economic empowerment of women. The fund was designed to address the perennial challenges that women face in their desire to venture in income generating activities (enterprise development) namely cultural institutions that do not allow women to own assets which are required by banks to access credit, high interest rates and bank charges from conventional credit institutions as well as negative perceptions about bank with regard to repossession of assets in case of default. The Fund targets women, who must be organized in registered self-help groups or companies owned by women. Men can be members in the women groups and companies provided that 70% of members are women who also hold all leadership positions. Funds can be accessed from branches of selected financial intermediaries or particularly for groups, from the office of the District Gender and Social Development Officers (DGSDOs) found at district headquarters. When obtained through the financial intermediaries, the funds attract an interest rate of 8% per year on a reducing balance. When obtained from the Ministry, no interest is charged but there is a 5% one off administrative fee of the loan amount. To access the loan, the group or company needs to have been in existence for more than 3 months. The group or company must have a bank account and be operating a viable business or planning to start a viable business. Security requirements include group guarantee, household items or business stock. The same Ministry runs the "Youth Enterprise Fund" with similar conditions for providing credit to youth.

Private credits come from mainstream banks as well as from micro-finance institutions. Mainstream banks have a preference for financially well-established customers. A credit salesperson of Barclays Bank explained to the researcher about his mandate of selling loans to teachers. Teachers are a low-risk target group since they have permanent contracts with their employer, the Teacher Service Commission. Although the bank may deal with individuals without an employment contract, such persons must provide convincing proof that they have stable assets and are undertaking a business that is generating income. Stringent credit application requirements have created demand for micro-finance institutions which fill the gap by making credit available with alternative requirements. The Kenya Women Finance Trust (KWFT), Kadet, Bimas, Faulu and Financial Services Association are the commonly mentioned names by Mwingi residents. These micro-finance institutions[60] also require credit applicants to be organised in groups such that the main guarantors to the credit are the members of the group. Unlike the government credit, groups are required to make deposits and amount lent out is dependent on the amount deposited.

Despite these available credit options, the study established that less than 1% of the household survey had obtained credit within 5 years to the time of the field work. It was observed that the challenge associated with finances to support adaptation practices was not so much a question of availability of financial resources but one of access and environment of its operationalisation.

The conditions that individuals and groups have to fulfil to access the funds are daunting. Government funds are limited in target group and qualifying conditions. The funds are available to women groups and youth group or companies. The condition of having to be in a group locks out those who, for varying reasons, are unable to participate in group activities. These may include household commitments or permission from spouse as some respondents indicated:

> "....all my children are in school, I am left alone in the compound. I can't leave my compound... the *chamas* (self- help groups) are there but I have not joined one...These are time wasting things... The only one I have joined is the one for funeral..."
>
> *Kanini Musunza*

[60] Detailed information on the operations of these institutions can be found in their websites: www.kwft.org; http://www.kadet.co.ke/; http://www.mixmarket.org/mfi/bimas; www.faulukenya.com; Aleke-Dondo, C. (undated), Financial Services Association (FSA) Model: The Experience of K-Rep Development Agency

> When it rains, going to the farm becomes the priory. Our husbands do not allow us to skip going to the farm to go for the group meetings.
>
> *Mumoni women FGD*

In addition, while individual households can come up with plans of where and how to invest funds obtained from a loan, the situation is not as easy in the case of a group. A group requires consensus from all members before they can proceed to apply for funds. Private funds provided by micro-finance institutions though in plenty were regarded as expensive, charging over 18% per annum in comparison to government's. This cost of borrowing plus the fear of inability to repay deters households from reaching out to them. As they indicated;

> Mark you, this money comes with interest. When they auction your items, they sell at very low prices. So you are never at peace when you have a loan. They recover even the interest. And their interests are very high, at 20%. But the government loans are cheaper (8%) only that the conditions are too stringent - it can take even a year to get that government loan.
>
> *Ukasi Women FGD*

Another challenge associated with access to micro-finance facilities related to the general poverty conditions particularly those relating to low incomes as they undermine the viability of the local enterprises. A common denominator featuring in discussions around ability to service credit facility revolves around purchasing ability of targeted consumers. The purchasing power is eroded farther during the drought periods as households reduce expenditure (consumption smoothing).

Taking credit to produce goods for sale in the local neighbourhoods is a risky endeavour that households fear to take. This fear lies in the inability to repay which can culminate in auctioning of one's property. For those who take credit, they are sometimes forced by circumstances to sell valuable household assets to service the credit, a measure that leaves them worse off than before the enterprise initiatives. As the Ukasi women noted;

> Some of the people who take these loans really suffer. Sometimes you increase your business stock, but there are no buyers since people don't have money. When the repayment time comes, you find you have no money. You are forced to sell a cow or goat and cover the repayment for 2 or 3 months. At the end of the day you make losses.
>
> *Ukasi Women FGD*

It is under these circumstances that many households hesitate to reach out for credit facilities to enhance their desires in expanding adaptation practices of diversification and storage. The high interest rates, daunting eligibility conditions, low purchasing power linked to general poverty conditions and cultural inhibitions explain the paradox of availability of credit yet households lament of having no money to undertake adaptation practices. Therefore availability of credit is only a first step and the challenge lays in the details of its accessibility.

6.1.4 Humanitarian aid and adaptation

In interacting with the local people of Mwingi, it is inevitable to become aware of the theme of humanitarian aid, specifically food aid. Food aid is closely linked to droughts. Droughts precipitate crop failure and food shortage crisis, which is then managed with distribution of free food. There are mixed perceptions regarding the place of food aid in contributing to supporting households to regain their well-being. The study sought to discern if food aid had any influence on households' choice and/or ability to take up adaptation practices.

Numerous humanitarian non-governmental organisations as well as government provide food aid in Mwingi particularly during drought. Action Aid, Kenya Red Cross, ADRA, World Vision and German Agro-Action have from time to time provided food either under free distribution or through food-for-work (FFW). Where food is provided for work, in Action-Aid-speak, it is also referred to as food-for-assets (FFA). The government provides food through the provincial administration.

Food aid first and foremost plays a critical role in saving lives. Mwingi region frequently experiences droughts which result in crop failures and massive shortage of water and pasture. The food shortage crisis that results is thus attributed to drought, precipitating in declaration of regional or national disaster depending on the spread. Between 1990 and 2011, six droughts have been declared national disaster emergencies 1992-93, 1995-96, 1999-2001, 2004-2006, 2008-2009 and 2011. These declarations are a legislative move that opens up for national and international mobilisation of food aid. The World Food Programme working through Action Aid provides the biggest bulk of the food aid while the government supplements from its own strategic food reserves under the NCPB. The Kenya Red Cross complements the efforts by managing collection and distribution of food aid from spontaneous sources such as those mobilised by the media companies. Politicians also play a key role in the mobilization process. Beyond saving lives, it is claimed that food aid provides households with time and energy to concentrate on preparing their farms for the next planting season instead of speeding time in search of food for survival. In this instance, the food aid aims to secure households' future food production.

The food crisis and food aid are problematised as follows: Rains have failed, there has been a crop failure, water reservoirs have been depleted (dry earth and sand dams and rock catchments; dry river beds), there is shortage of drinking water, livestock have been lost due to lack of pasture and water, the local population is poor with little reserve assets to fall back on; they

are forced by these circumstances to sell their assets or to exploit the natural resources in an unsustainable manner. Tree felling for charcoal burning is for instance provided as a case example where population endeavours for survival lead to biodiversity losses as trees are indiscriminately felled. Given this drought scenario, people are in dire need of food aid. Food security assessments[61] are undertaken to rationalise and prioritise individuals and areas requiring the food aid. The objective is normally to meet the basic nutritional requirements and assist households to recover from the drought and the famine. Priority is given to the 'most vulnerable', defined as: the aged, expectant and lactating mothers, children under 5 and people living with HIV/Aids. Children under 5 are particularly of concern as they are identified as more sensitive and prone to malnutrition during times of reduced food intake than other categories of people. There is also a school feeding programme that aims to reduce school dropout. The government, non-governmental organisations, private organisations and politicians consequently engage high gear of mobilising food aid which is distributed to the local populations. The media also plays a significant role in informing the country of the severity of drought and making food aid appeals (see examples of newspaper captions in photo 19 below).

[61] The research participated, as an observer, in such an assessment in January 2010 at the beginning of this study's field work

Photo 19: Depiction of droughts and food aid in the media

Source: various national newspaper publications

Controversies sometimes arise on the mode of distribution, particularly on beneficiary identification. While the NGOs wish to prioritise food distribution based on criteria of vulnerable groups, politicians prefer that their mobilised consignments are distributed indiscriminately, a strategy that promotes their popularity. Other forms of aid provided include planting seeds and tools for soil and water conservation (see photo 19). It is hoped that with these, the people will recover from the impacts of drought, plant a fresh and get food self-reliant soon as the rains set in.

Perception of food aid in Mwingi

There is no consensus opinion, from households, government, development and humanitarian agencies working in the area on the rationale of food aid and its role in contributing to households' capacities to recover, prepare and support their well-being in the event of subsequent climatic shocks, although its immediate and short-term rescue remedy is appreciated. During the 2008/2009 drought, which was regarded as one of the worst in Kenya's history with droughts (Kioko 2013:2), about 64% of sample survey households were provided with food

aid distributed mainly by Action Aid and the government. Majority of households felt that the food aid was useful irrespective of whether they received it or not. There was a general agreement that by the time the food arrives, hunger was widespread and many households were suffering as they lacked alternatives to fall back on e.g. to get a casual job or have a close relative with the ability to support them. The food therefore gave households strength to look out for work or at least to prepare their own farms for sowing. Food aid was also appreciated on the basis of its ability to save household assets from liquidation to buy food from the market. Livestock in particular were mentioned as one form of household asset that was given longer life span of ownership. In addition, the local people felt that reduced attention on search for food created a time chance to go out and look for money to cater for other household needs such as school fees and school uniforms as well as food commodities not availed in the food aid package – for instance sugar, salt and tea leaves. Interestingly, once some families were on the food aid list, they used the opportunity as guarantee to secure credit from the local shops, which would be repaid later on receipt of the relief portion. The repayment would be paid either directly with the food aid or would be sold to a neighbour and the money taken to the shop to clear the debt. There was also appreciation of the food aid on the basis of social relations. Some acknowledged that food aid helped those who received as well as those who did not through sharing it. There was the view that the level of begging amongst community members also reduced when the food aid was available compared to when it was not.

But not all respondents agreed to its usefulness. Its irregularity and inadequacy was cited as the main shortcoming. The food portions provided by Action Aid, either as "general food distribution[62]" or as "Food-For-Assets[63]" were considered to be by far more helpful and consistent than the sporadic government food aid. Action Aid allocates 41kgs of maize and 6kgs of pulses as well as some cooking oil, with a regularity of about a month. The households claimed that this food is able to take them for about 1-2 weeks depending on the size of the family. The government food aid on the other hand had no regular schedule, coming sometimes after 3 months, and since it was given to everybody indiscriminately, each household would get 1-2kilos. Many households therefore felt that the government food aid was too lit-

[62] Food allocated to those considered vulnerable and without ability to engage in strenuous work e.g. the very old, pregnant and lactating mothers.

[63] Food allocated to those considered as vulnerable but energetic to engage in work. They are normally engaged in making of bench terraces, de-silting of community earth dams or clearing of rural access roads. Sometimes some organisations that engage this group pay cash – e.g. German Agro-Action pays Ksh1,440 per month. The participants work for a maximum of three days a week, with the expectation that they would spend time on the farms during the rest of the time of the week.

tle, came in too late, unreliable and was even a waste of time to go for. Beyond contributing to briefly managing hunger, the respondents felt that food aid in general was never a lasting solution. There are others, especially those who do not receive, who felt that perhaps the food aid creates some complacency in preparedness for the harsh times or dependence on the food aid.

Another criticism levelled against food aid is based on its implementation rather than its very essence of existence – the food is rarely ever enough to cover those in need of it – the list of those who need it is longer than the amount available. Reaching targeted community groups is problematic. In a meeting to discuss security issues between Kamba and Somali community, issues of food aid were brought to the fore. A participant from Mandongoi sub-location, Ngomeni division, complained that elderly people, some over 70 years old were expected to collect government food aid 20km away from their residences. Mandongoi is very remotely located and has no reliable public transport. In addition, according to the people, corruption is also another issue embedded in food aid distribution. However, there was no clear evidence to substantiate the claims.

The importance of food aid is not shared by all in the governmental institutions particularly those not involved in its distribution. Some think that free food leads to dependency, that food aid may be reducing households' motivation to prepare for climate risks on their own. A key informant from MoA reiterated how food aid had distorted local people's traditional drought management strategies. In his opinion, traditional crops such as cassava, yams, millet and sorghum are losing favour with the local people because of the widespread use of maize in food aid. Box 7 below summarises the perceptions of food aid in Mwingi.

Box 7: A brief summary of respondents' perceptions of food aid

Positive views	Negative views
• Food aid helps in maintaining members' energy and providing an opportunity to spend time in own farm • It assists during times of severe food stress • It bridges the gap, pushes you for about a week. • Food-for-Assets is good - it lasts for two weeks. We cover the remaining two weeks with wages from casual work • Yes, some people depend on that food aid for survival because they have no other source of income • It helps. We even share with those who did not get, and they return when they get their own • It limits selling of animals - this helps in turn to pay school fees. • It saves on livestock when you get aid food that month you won't sell your livestock • It helps. Some people even get credit from shops to repay when the food aid comes • The Food-For-Assets promotes team work spirit as we work together • Yes, it helps to reduce the practice of begging from others	• We are given one-day support instead of lifetime support. We need more sustainable measures • The rations are too small for the whole family • It helps only for a short time • Food aid creates dependency among people • No, it is not helpful. You are given 2 kilos, how long can it last? It is time wasting going for it. But food for assets is better as it can last for a week or two • Unreliable and takes a long time to arrive • Food aid helps but we need a lasting solution to these food problems - not everybody gets the rations and you cannot rely on it fully • It interferes with traditional drought coping strategies • There is corruption in its distribution
Source: Compiled from responses of open-ended questionnaire questions	

Criticizing food aid on the claims of a dependency syndrome is rather weak as it is unrealistic to conclude that a household fails to plan and prepare for climate shocks because of expected 2kgs of maize which lasts for 2 days or less and only availed again after another 3 months. Similarly, true to the humanitarian argument, food aid is just that, aid, to help people keep alive. It is a gap filler. It is not aimed at transforming the structures that precipitate its need. The humanitarian organisations thus feel they are doing their job, intervening at times of food emergency. Their energies hence dwell on mobilising enough food and reaching the identified vulnerable community groups. The provincial administration and the politicians feel they have a mandate to ensure people access food aid when food crisis arise.

The divergent opinions on the importance of food aid, along those involved in its mobilisation and distribution and those not involved, may be a pointer to interests beyond saving lives and preparing households to recover from the impacts of droughts. As it was observed, the political voices are normally very active in mobilising and distributing the food. Food distribution

is not complete if a local politician[64] who has been involved in its mobilisation has not come to flag off the event in the presence of the flashing cameras (see photo 20 below). Local households are reminded of the great efforts made to ensure the food gets to them. Since a good gesture like that of saving life in times of need deserves reciprocation, votes count as a valid and good way of demonstrating gratitude during times of elections of political representatives. There is therefore a remote link between supply of food aid and private vested interests by actors involved in its supply. Hence, the question should not be so much about whether food aid is good or bad in relation to enhancing households' ability to undertake adaptation actions, but the extent to which it camouflages other interests and diverts resources and attention for long-term robust support to adaptation for short-term interventions.

[64] In chapter three, it was indicated that some segments of the people of Mwingi were sceptical about the hyped silver jubilee celebration of their political representative, who was also the country's serving vice-president – also the person in the picture above. It is scenes like this, where politicians are engaged with community emergency issues while visible on long-term solutions to people's challenges that generate the discontentment. However, that critical voice does not appear to have much strength for change, as indicated by the many years of service by the politician despite the persistent challenges to livelihoods of the people of Mwingi.

Vice-President Kalonzo Musyoka flags off food worth Sh7 million to Kitui and Kajiado. With him are Manjit Singh and Jaswinder Singh. The food was donated by Khalsa Aid and Sikhs of Kenya at Sikhs Temple Parklands, Nairobi. Photo: Jonah Onyango/Standard

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Photo 20: Flagging off food aid

Source: The Standard Newspaper

The food aid question in relation to household adaptation practices partly lies in the very way that the food crisis is framed – the natural causality – that droughts precipitate food crisis. From a pragmatic planning as well as a realist perspective[65], this framing of the cause of local people's suffering misses to capture the following facts:

- That most of the food crisis during drought occurs in the arid and semi-arid areas due to their higher sensitivity of rain-fed production compared to other agro-ecological zones;
- The Kenya Meteorological Department provides weather information in advance, hence a looming crop failure due to inadequate rainfall is known to government and NGO planners well in advance;
- That many people in Mwingi and other ASAL areas are resource poor: the nature, level and causes are known and have been subject to all manners of studies and target of development projects.
- Rain-fed agricultural production in a non-drought year is not optimal and only supports minimum survival. Land degradation, affordability of costly farm inputs that would assist farmers improve production contribute to limiting amount of harvests. This production cannot therefore be banked on during drought years let alone normal years.

Further, from a constructivist perspective[66], the natural causality framing advances technocratic solutions aimed at fixing the problems that seem to arise unexpectedly. The drought as a single event is linked to multiple outcomes. Yet, in reality, there are multiple causes, interacting and working in tandem to produce multiple outcomes. The natural causality view thus closes window for any discussion on social, political and economic causalities. Economic and political marginalization embedded in the macro-structures are evident in the region as demonstrated in chapter 3 on Mwingi and its wider context.

[65] A realist perspective holds the idea that scientific enquiry must rely upon empirical validation or falsification. (Oulasvirta, A., Tamminen, S. and Höök, K. (2005) Comparing Two Approaches to Context: Realism and Constructivism. In proceedings of The Fourth Decennial Aarhus Conference, Aarhus, Critical Computing: Between Sense and Sensibility, Denmark.

[66] A constructivist perspective offers that social world is constructed; knowledge is constructed. It is contingent on human perceptions and social experience. It provided a stand point from which multiple interpretations and understandings of context are legitimised and from which these understandings can be imported into a design process. (Oulasvirta, A., Tamminen, S. and Höök, K. 2005. Comparing Two Approaches to Context: Realism and Constructivism. In proceedings of The Fourth Decennial Aarhus Conference, Aarhus, Critical Computing: Between Sense and Sensibility, Denmark, 20-24 August 2005)

As illustrated earlier in this chapter, market, credit, critical infrastructure and poverty remain a constant challenge to households' ability to optimize on chosen adaptation practices. The local population lacks a strong voice to hold the government to account for food crisis. The existing organizing power is non-confrontational (see chapter 7 on self-help), working on how to fit within the constraining structures and grab the few opportunities that arise. There is a feel of loss of grip of their decision-making power, as some express powerlessness such as "we don't know what to do".

In addition, the government has a record of dragging its feet on critical policy initiatives that would partly address some of the local population challenges that are linked to natural events. The National Disaster Management Policy which was first drafted in 1999 was not passed by parliament until early 2013. The commitment of the government to comprehensively address the very disasters it deals with in ad hoc manner thus remains questionable. Indeed, there is more evidence to link drought, food crisis and politics. At a national level, declaration of drought as a national disaster by the government is notable to have accompanying side opportunities relating to award of food importation and supply contracts. A case example is the 2009 national Maize Scandal that was investigated by the African Center for Open Governance - AFRICOG (2009). According to AFRICOG, companies and individuals who were not maize millers, no milling premises or capacity, were allotted import license to import highly subsidized maize following shortfalls in the government's strategic grain reserves at the NCPB occasioned by low yields after the destructions during the post-election violence and drought of 2008/2009. The policy directive was to launch a maize meal subsidy scheme with the lowered price intended to provide a reprieve to low income earners and those at edge of starvation. These individuals and companies subsequently sold the maize to genuine millers and in the process made exorbitant profits. There were some reports of at least one hundred thousand bags diverted in this way. This negatively affected the desired outcome of reducing prices. Another study by Friedrich Elbert Stiftung (2010:17) also documents how political parties in power improve their reach in mobilization by using state resources to bribe voters. It cites National Alliance of Rainbow Coalition (NARC) which used food aid to bribe and attract support during the 2005 constitution referendum campaigns.

The very framing of the food crisis and the subsequent measures engaged to address the crisis thus shift focus, energies and resources from structures underlying the factors that inhibit deployment of and realization of optimal benefits of household adaptation practices. The continued use of food aid is thus unlikely to end soon since it deals with a different problem – one

that is urgent, life-threatening and short term. It cannot therefore be evaluated by other performance indicators. As long as the social, political and economic structural causes of the food crisis are not addressed, the rationale for food aid will remain and the vicious boom and bust cycle of bumper harvests followed by hunger will continue to be part of Mwingi. Thus, stopping food aid, as some have alluded to will not result in households miraculously getting very innovative and planning months and years in advance to engage in a myriad adaptation practices to prepare and strengthen their well-being in the face of climate risks. Food aid can perhaps be regarded as an indicator of failure of household adaptation practices. It need therefore be seen as a back-up intervention by government, NGOs and private sector, a social contract[67] and a right to bail out households when need arises, while prioritising to redress structural factors underlying the constraints to undertaking adaptation practices. In the meantime, continued need for "fire-fighting" preventable "fire" through food aid will continues to eat into resources that should have been prudently used to transform structures that generate the "fire" in the first place. Food aid therefore plays a role in saving lives and not addressing structures that precipitate food crisis. It also aids to maintain a status quo of skewed power relations between the "givers" and receivers", based on vested interests.

The foregoing section has explored how socio-economic settings relating to provision of key infrastructural goods, market and credit access as well as food aid provisions, bound the choices and effectiveness of the adaptation practices that houses undertake. In the following section, the historical settings are reviewed to also tease out their place in households' adaptation choices and practices.

6.2 Historical setting: path-dependence of adaptation practices

Three issues were prominently noted during the field work - bench terraces, community self-help groups and the theme of trees planting. First, bench terraces were conspicuously observed on almost all households' farms. Second, trees were variously perceived to influence the climate and weather of Mwingi. Digging bench terraces and planting trees were suggested by most respondents as desired future strategies to prepare and manage climate risks. Third, community self-help groups appeared to be the standard approach of governmental, non-governmental as well as private organisations in interacting with the local people. Additional-

[67]Social contract is explained by Pelling (2011:90) as a notion of Western political philosophy built on observed customary practice about the nature of political authority and popular consent. The social contract was the basis for the creation of political societies in which all could secure their basic needs, exercise creativity and enjoy individual autonomy in peaceful sociality, with the trade off of forfeiting all or some amount of their freedom/power to the dominant social actor (the state) in order to ensure personal security. In adaptation to climate risks, a social contract would stipulate clear responsibility of the state actor.

ly, households organised themselves into groups for different communal purposes such as pooling labour, finances, medical and funeral expenses. Through an overview of the historical backgrounds of these three aspects, this section brings to the foreground the path-dependent[68] nature of household adaptation practices. It demonstrates the multiple motivations that inform choices of adaptation practices undertaken by the households. The three aspects are used to explain how past decisions and practices embedded in governance, development/disaster risk reduction practices influence current and future household adaptation choices. According to Pierson (2000), past lines of policy have a high potential of conditioning subsequent policy choices. In the case of Mwingi, past lines of policy regarding soil conservation through bench terraces and tree planting as well as policies on rural development through community self-help groups, condition household adaptation choices. The popularity of bench terraces, tree planting and self-help groups as forms of storage and communal pooling adaptation practices can therefore be seen in the light of historical policies and practices undertaken by governmental and governmental organisations working with the local people.

6.2.1 Bench terraces

The history of bench terraces is narrated in the literature in two phases – colonial and post-independent eras. The beginning of 20th century witnessed the take-over of best farming lands by colonial farmers, pushing local populations to more marginal (less agriculturally productive) zones. The Kamba's traditional land use and grazing management systems were unable to deal with new pressures resulting from increased settlements and livestock numbers of those displaced by the colonial farmers. Colonial governance overruled existing Kamba governance system such as free movement of livestock in dry/drought periods, resulting in land degradation. Exceeding livestock carrying capacity was diagnosed as the problem and the local people were forced to destock and to construct bench terraces on the farms (Rochleau 1995). The orders were resisted without success not only in *Ukambani* but nationally.

When Kenya attained independence in 1963, the regulations on destocking and soil conservation through bench terraces practices were relaxed. However, since independence did not quite revert the land rights of the local population to pre-colonial period, land degradation from soil erosion escalated, prompting the new government to persuade local farmers to take up the very measures they resisted during the colonial period. The Ministry of Agriculture

[68] Path dependence in this context explains how the set of decisions a household has for adaptation practices is limited or influenced by past circumstances. This is derived from Liebowitz and Margolis (2000:981) who assert that ".... where we go next depends not only on where we are now, but also upon where we have been." (Liebowitz, S.; Margolis, Stephen. 2000. *Encyclopedia of Law and Economics*. ISBN 978-1-85898-984-6.

spearheaded the soil and water conservation campaign. Between 1974 and 1994, the Kenyan government with support of the Swedish International Development Agency (SIDA) implemented the Soil and Water Conservation Programme (SWCP) under the Ministry of Agriculture. This programme was followed by National Agriculture and Livestock Extension Programme (NALEP, running 2000-2011), which took a more integrated approach whereby soil and water conservation was just one of its multiple components (Mutisya *et al.* 2010). Other players such as non-governmental development and humanitarian organisations have joined in the campaign for soil and water conservation as a strategy for improving productivity of arable land. In Mwingi, for instance, food-for-work based food aid is provided on participation of particular activities such as community projects (e.g. earth dams) or on digging of terraces.

The bench terraces have gained currency even in the mainstream adaptation to climate change policy and practice. The KACCAL project document has a component labelled "community driven initiatives" whereby a key activity is reduction of soil erosion (UNDP 2009:26). Its predecessor, the Arid Lands project II had two components under which soil conservation measures were undertake – natural resource management component and community-driven initiatives component. In 2008/9 reporting year, 17 community self-help groups were provided with soil and water conservation tools (Republic of Kenya 2006:27) (see photo 21 for a tools distribution ceremony).

6.2.2 Tree planting

The link between climate and trees can be traced from Kenya's long history of campaigns to increase tree cover. According to a UNEP study, Kenya's total forest cover in 2005 stood at 6.2% and at a 0.3% per annum deforestation rate against a recommended forest cover of 10% (UNEP 2009). Arid and semi-arid regions have borne the blunt of soil erosion from high intensity rains. Colonial and post-colonial Kenya governments crusaded for planting of trees and terracing as a measure to curb soil erosion and regulate climate. This is best exemplified by Daniel Moi, the second president of Kenya who was a key ambassador[69] of tree planting. The provincial administration, which comprised state governance structures from the national to the village level (administered by a village elder) have been the mouth-piece for promoting tree planting campaigns. Public hearings, popularly known as *Barazas* provide the platform for reminding citizens of their patriotic role of the country´s well-being and one such way is

[69] Daniel Moi, Kenya's president from 1978-2002, marked every other event by planting a tree. In 1990, the author recalls the then president Moi attended a High School anniversary event and the tree he planted was marked with a marble stone – indicating that the tree was planted by him on the anniversary day and year.

to plant trees under an old slogan "*Kata moja, panda mbili",* meaning when you cut one tree, you should plant two. Mass media, in particular the radio, was used to popularise tree planting and soil erosion control. Another example is the renowned 2004 Nobel Peace Prize Laureate, the late Prof. Wangari Maathai. Maathai and her organisation, the Greenbelt Movement promoted planting of trees as a basis for improving land productivity, water retention and soil erosion control.

6.2.3 Community self-help

House-Midamba (1996) notes that Kenya has had a vibrant history with self-help. Two main forms of self-help during the colonial period are notable. The first form comprised self-help groups founded by the Kikuyu[70] during the late 1930s and the 1940s, to develop schools, which were not provided by the colonialists. The initiatives were a form of protest to the suppression meted on the local populations by the colonial government particularly through massive seizure of land and biases in infrastructure, cropping, marketing, extension and taxation. The spirit of volunteering engendered through self-help-built schools through donations of money and labour paved way for the establishment of grassroots organisation movements that promulgated principles of self reliance. The second form was promoted by the colonial government itself and was built around community development programmes.

In *Ukambani,* Rocheleau (2001:80) notes that self-help was a concept built on the traditional Kamba *Mwethya,* renowned reciprocal communal work groups. *Mwethya* were large groups of men and women, often from entire village, mobilised to assist with periodic tasks such as home building or forest clearing for new fields. Daily and seasonal activities such as weeding were also conducted by groups of extended family or neighbours.

It is these *Mwethya* that the colonial government invoked as they coerced the rural people in *Ukamban*i to construct and maintain state infrastructure such as roads, gully repair, dams and soil conservation structures during the 1930s and 40s. As most men were away at war during World War II, the colonial officers mobilised women *Mwethya* in forced labour gangs for land rehabilitation efforts. The colonial Community Development Department and the Agricultural Department also supported formation of community groups for the purposes of building terraces and undertaking other rural development project (Tiffen *et al.* 1994).

Soon after independence, the mandatory group work ended and a different form of self-help emerged. It was neither solely dependent on outside initiative, finance and control, nor really

[70] An ethnic group mainly residing in central Kenya and speaks *Kikuyu* language

self-reliant. Jomo Kenyatta, the first president, encouraged all citizens to participate in self-help projects. Voluntary associations proliferated under the clarion *Harambee*, which literally meant "let us pull together" in Kiswahili language. Through the *Harambe*e efforts, rural dwellers were strongly encouraged to develop self-help strategies and to ask for assistance from their elected leaders. On the other hand, leaders could develop a political base through the assistance they provided to citizens. The Ministry of Culture and Social Services (MSCC) succeeded the colonial Community Development Department. They trained groups in project planning, committee leadership and accounts management among others, with the aim of enabling them to effectively undertake group activities (Nzioka 2000).

According to Rochleau (2001), in *Ukambani,* the *Mwethya* groups rejuvenated with state sponsorship, mainly as women's groups, often with a few men as advisors or co-leaders. The majority of the men were still away, as labour migrants in major urban centres like Nairobi, on plantations or in the army. Rochlaeu notes that the local government officials often selected the sites and determined group work schedules within a national soil and water conservation campaign. Forestry and agro-forestry (tree planting programmes) were added to women's groups' agenda in response to the "energy crisis" of fuel-wood shortage.

From a national perspective, the Government promoted women groups ostensibly as *vehicles* for rural development but in reality it was a strategy for attracting foreign funds (Nzioka 2000). The creation of a Women's Bureau in the MCSS followed the UN Women's conference in Mexico in 1975, and was a manifestation of the Government's commitment to the improvement of the welfare of women. Donor funds earmarked for gender-oriented rural development were channelled through women groups. Consequently, the number of women's self-help groups registered with the MCSS has always tended to be higher than those registered in other categories of self-helps (youth, mixed groups). The groups have elected officials, a constitution, keep accounts books and make annual returns to the Ministry. This enables them to attract or solicit external material and financial assistance from politicians or donor agencies. However there are many more informal groups which pursue traditional welfare and social purposes such as funerals, marriages and household welfare goods.

During the rule of President Moi (1978-2002), particularly at the onset of the clamour for democracy from the *de jure* one party state, formation of many community groups was politically motivated. Country-wide, there was a considerable increase in the registration of self-help groups especially in the period preceding national elections e.g. 1992 and 1997 (Nzioka 2000). In 1997, for instance, the then president Moi organised a national *Harambee* to osten-

sibly to raise funds for women and youth-oriented income generating projects. In reality, it was an initiative to raise the ruling KANU party's popularity in the lead-up to the 1997 general elections. Since the beneficiaries had to be organised groups, those who wanted to access this money quickly constituted themselves into groups and registered with the MCSS for the sole purpose of getting that money. Individuals could become members in different groups to increase their chances of accessing the funds. Given that their main purpose was to access the money from the Presidential Fund, no sooner had the money been received than the groups disbanded (Nzioka 2000).

In *Ukambani* in general and Mwingi in particular, self-help groups continue to have two variants – groups that are informal (unregistered) and groups that are registered entities. The informal groups are loose networks that define their mandates and objectives which may include pooling finances together, hence the rotating micro-credit and savings groups, sharing covalent risks like illness and death, or run small joint enterprises. They may choose to be registered, in which case, the objective is to provide a strategic outfit for interacting with external institutions such as the government and micro-finance organisations. Many of the registered groups are therefore a product of pressures and opportunities determined by the state, private sector and non-profit organisations' interests as well as by local needs and aspirations.

This background thus accounts for the seemingly high affinity to communal pooling as an adaptation practice. Over the time, the local community has learnt that to get support of different forms – finances, technical skills, materials such as water pumps, soil conservation tools, they have to be organised in groups. Engaging in communal pooling through self-help is therefore a choice that is historically moulded and not an emergent characteristic of perceived changes in climate.

The histories of self-help, soil conservation through bench terraces and foresty/agroforestry through tree planting are intertwined. Self-help has been invoked at different points in Kenya's history to fulfil a variety of interests by colonial government, independent Kenya government, development agencies and private sector. Community self-help groups have been the target of the bench terraces and tree planting "gospel" preached by technical extension staff as well as the recipients of complementary tools and materials. This to a large extent accounts for the extent to which trees are linked to climate while both are perceived as feasible future adaptation practices. This connection related to what Roe (1999) refers to as the expatriate narrative, whereby opinions provided by external actors are provided with the aim of making the listener believe in the story with its causal chains of action, explanations and solutions.

When households mention tree planting and making of bench terraces on their farms as their desired activities, they are partly reproducing the information they have been given to demonstrate that they have understood what they have been taught and are expected to do.

Payment with cash or food through the food for assets programmes practices by some of the NGOs working in Mwingi has also contributed to the wide adoption of bench terraces. Food and cash act as incentives. Informal discussions in the field revealed that in cases where food or cash is provided to motivate construction of terraces, the undertaking is abandoned soon after the provision is withdrawn. Urgent households' needs, particularly food and cash, get households' preference in allocation of time and labour.

In a nutshell, Kenya's historical policies and practices significantly account for the contemporary households' choice and practice of adaptation through bench terraces and tree planting (storage) as well as self-help groups (communal pooling). This influence can be understood in light of historical institutionalism (Steimo 2008). Over time, institutions of soil conservation and community development through self-help continue to influence households' behaviour in choosing adaptation practices. The historical context that these institutions originate provides the frame of preference formation for adaptation practices.

Photo 21: Distribution of soil and water conservation tools

6.3 Cultural milieu of adaptation

The study hypothesised that the cultural milieu also had a hand in the adaptation practices practiced by the households. The field data was therefore teased out to trace elements of culture that are linked to adaptation practices. While some, like kinship relations enhanced up-

take of adaptation practices, others, particularly relating to gender issues were observed to undermine adaptation practices.

6.3.1 Kinship relations

Family relations were observed to play a vital role in household adaptation practices. The kinship relations are hence harnessed to provide anchor for communal pooling as well as mobility to manage climate risks. In a discussion with a key informant, the potential of kinship in communal pooling was brought to light;

> (In reference to a family earth dam) "..... Then I mobilised my family[71]. We contributed money and hired people to dig it. I was the one in charge of collecting the money and coordinating the work...). (In Reference to the 2009 drought) "....I did not lose a single animal. Although my earth dam had dried up, my brother's well (son of my uncle – son of my father's younger brother) still had water. It is hand-dug but never dries up. My livestock were getting water from there. So at a moment like this, his cattle drink from my earth dam. During the drought, my cattle drink from his well. So we rely on each other."
>
> *Kamusiliu FI*

Kinship relations also play an important role in mobility. Although the common practice is to take livestock to far off grazing areas and return with them later when the pasture situation improves, kinship relations reduce the need for the owner of the livestock to move with them Instead, they are given to the kin member who inhibits an area not badly affected by the dry/drought conditions, to be returned when the pasture situation improves. In a focus group discussion in Ukasi village, the villagers explained how they took their cattle to their relatives. In return, the hosting family would benefit by taking the milk from the cows or retain the goat kids born while the herd is in their custody. The exact details of these arrangements are left to the two families to agree upon.

6.3.2 Culture-based gender biases

Culture-based gender dictates were discernible in the way men and women pick and undertake adaptation practices. These were observed in the context of property ownership, decision-making and reproduction roles which differentiated how men and women harnessed adaptation practices of diversification, market exchange, mobility and communal pooling. In *Ukambani*, livestock play a significant role in households' well-being. They are a source of milk, meat and cash. They also have a place in social-cultural values as symbol of social status and payment of bride price in marriages. Women do not normally own high value large stocks like cows. They also cannot decide on disposal of the large stocks on their own without

[71] Reference to family – in this compound, there were several households referred to here by the respondent as family – This 3 brothers and 2 half brothers (the sons of his father's second wife).

the consent of their husbands. Women are however at liberty to rear and dispose at will smaller stocks such as chicken.

> "...If a woman needs money for the household operations, they sell the chicken and eggs - without having to ask the *Mzee* (husband). A woman cannot sell a goat without permission from the husband. This can result in a beating by the husband. Even if the need for money is for school fees, the husband has to give permission. Same case applies with the cow. While the woman can take the goat to the market, the *Mzee* takes the cow".
>
> *Ukasi Women FGD*

The result is that women have turned to projects such as chicken rearing as this provides a domain of freedom, albeit limited. The Ithumbi Farmer Field School (FFS) group, which comprises 70% women, has ventured into chicken farming as a group with support from the Ministry of Agriculture. It is notable however that a woman can own goats if she purchases them with her own resources or is given the goat by the husband. Else all other goats belong to the household and sale consent has to come from husband. In effect, gendered design of ownership and making decision on sale of assets such as livestock affect the way men and women harness diversification and market as adaptation strategies. The scope of ownership define the extent to which women can diversify their livelihood options – they are limited to lower value stocks, compared to men who can own any type of asset. Because husbands have overall decision-making power, they can sell even assets owned by their wives. Informal conversations in the field revealed that women who received "cash-for-work" bought goats, had resulted to "hiding" them with friends and relatives, away from the knowledge of their husbands. They feared that their husbands may sell them off against their wish.

Gender differentiated power of decision-making also influences the way men and women undertake adaptation practices of mobility and communal pooling. Men are more likely than women to move out of the homestead to go to neighbouring town – Mwingi or far off towns such as Mombasa, Garissa and Nairobi to seek waged labour. In a household with a husband and wife, the wife cannot move away temporarily or permanently to seek waged labour without approval from the husband. In the study household survey, 15% of female respondents indicated that their husbands were working in towns. None of the male respondents indicated that their spouses were working out of homestead on temporary or permanent basis while they (husbands) lived in the village tending the farm and children. This implied that mobility as an adaptation practice is gendered in favour of men as the cultural bias provides men with more mobility flexibility than women.

A woman as a spouse cannot also join a community group (for communal pooling), or obtain credit without approval of the husband, although the reserve is considered in order. A talk with a key informant illuminates this position of women in the household when it comes to participating in adaptation activities:

> "...You see that building over there? (...). That is where we were being trained. That training opened my eyes**.** So we discussed with my wife and agreed that she joins Kenya Women Finance Trust.
>
> "....So I do my work and attend functions outside. I also let my wife also attend. I am left behind and have to do everything. But some people will not let their wives go..."
>
> *Kamusiliu FI*

In accessing credit, efforts of women emancipation appear to clash with cultural patriarchal dominance that requires women, particularly wives to be guaranteed by their husbands before their credit application is considered. If the husband does not support the proposal, the wife cannot access the credit. In a focus group discussion, men were not happy that micro-finance facilities targeting women directed their communication solely to women. It was felt that all members of the community should have been informed about the nature of credit and the requirements. That way, the men argued, they would support their spouses knowing all the details. This suspicious was not without basis. Some members in the focus group discussion cited cases where a woman would take credit, default and disappear from the village. The other members would have to pay up the debt. The husbands did not take it kindly when they were informed of debts that they did not directly accrue. In some instances, men have preferred that their wives do not join any group at all. Attempts to address inequalities in men and women's access to credit are received as a challenge to the men's authority. The following discussion from the focus group illuminates this scenario:

> My husband has to be the first guarantor in every case. If he refuses, that is it! But when the man goes to take a lone, the woman (wife) is not required to be present to guarantee.
>
> *Mumoni Women FGD*

> "Yes, he (colleague in the focus group discussion) has pointed out the issue. That is the problem - the way the programme was brought. You know, the way you convey the message to a person is important. The coming of micro-finance (institutions) was welcomed but the community members were not communicated to well. The issue should have been addressed to women, men and youth together. I do not like the arrangement – they call my wife here at the district headquarter, together with other women. They hold a women only meeting. The women are told to form groups so that they can be given money to start businesses. But which business will do well? She has a family, and if she has no cooperation with the husband, will she succeed? That is the problem. If they held a public meeting for everyone and from there they tell people to form groups, the situation would be different. I am happy when my wife gets an opportunity, but I need to be aware of what is happening. You see, my wife will apply for the loan by obtaining signatures from wife of x, wife of y and wife of z. And the husbands do not know who the wives have guaranteed. How do you find that scenario? It has brought friction even into the family. Because the hus-

band gets to know later after digging deep into how the loan was taken. Even people's lands have been sold.

(The lady in the group**)** – it is better when you apply for the loan with your husband. Sometimes some women take the money and don't tell their husbands. When they are unable to pay, it becomes an issue in the family. Sometimes you are in the group leadership and have to pay up for the default of the other members. We are afraid that the unity in families is being threatened. The programme is good but needs to ensure that the approach is all inclusive. These Women Funds have become problematic (*Hizi pesa za women zimeleta kisilani kabisa),* because the men are not properly informed. The funds should be delivered in a different approach."

Migwani FGD

The other gendered aspect relating to adaptation practices is the reproduction roles. Women as caretakers of families are left behind to tend the children and the farm. The choice of mobility as an adaptation practice is thus limited by the reproductive roles that the female members of a household have to undertake. This is irrespective of how rewarding the activity is, as a respondent narrated:

"I started a business of buying and selling livestock. But I stopped operating it when my daughter gave birth. I stopped to take care of the baby. I did not have someone to help me in the house. So it necessitated that I stop my movements, you know I was going to different markets - buying from one and selling in another. And I was doing very well."

Chair-Ithumbi FFS

These culture-bounded gender biases on decision-making, property ownership and reproduction compound to differentiate how men and women within a household access and optimise adaptation practices of mobility, diversification, market and community pooling. Men are consequently favoured by the gender bias.

6.3.3 Cultural attachment to livestock

Livestock plays a significant cultural role among the Kamba. It is a store of wealth. It is also the medium of signing marriage relationships through payment of dowry (see Box 8 below). As a store of wealth, also referred to as *wealth-on-hooves*, the size of livestock herd is a social status symbol. It is common to find a household living in a semi-permanent house but with numerous livestock. The person is unwilling to sell away the cattle to construct a permanent house. Livestock are sold only as a last result – when all other options of supporting the household well-being have been exhausted. Indeed, very few households have bank accounts (24% from survey). Bank accounts are opened only when there is a demanding reason to do so – e.g. when applying for a loan. Cattle therefore have a symbolic value of social status – the more cattle you have, the wealthier you are considered in the society.

It is however a taboo to openly declare the numbers of livestock one has. A case in point was an occasion of an interview. After enquiring about how many livestock the respondent had, a huge herd of livestock passed by. A cursory estimation indicated that the actual numbers were more than thrice the numbers the respondent had provided. A separate discussion with the research assistant indicated that it was inappropriate to directly ask the question on livestock ownership statistics (in further interviews, the statistics on livestock was skirted around).

On marriages, livestock is the main component of dowry exchanged to establish marriage relationships between families. Any man aspiring to marry has to accumulate livestock in preparation. In the community workshop at Kavuvwani village (introduced in chapter 1), a guest offered Ksh1000 to a young man who in a group-work session that he represented, claimed that one of the challenges of the youth was accumulating livestock to pay marriage dowry.

The attachment to livestock is presumed to be linked to the unwillingness of households to dispose them off at the onset of a dry season. An optimistic wait and see attitude is used, with households hoping that the pasture situation will get better in coming season, that the rains will finally fall. By the time the rains fail in the awaited season, the animals are too emaciated and have lost significant weight to fetch favourable prices at the market. The result is distress sale of near-dying livestock. Huge numbers of weak animals drive the prices to incredibly low levels. During the 2008/2009 drought a mature cow would sell as low as Ksh5000 (approx. 50€) down from an average of Ksh30,000 (approx. €300). A household's decision to sell livestock to avoid imminent losses due to drought is therefore countered by a desire to uphold cultural values. This desire reduces the value of market as an adaptation strategy as it is normally too late by the time households go for the market option.

Box 8: Role of livestock in the Kamba marriage relations

> Livestock are part of the cultural functions of the Kamba community. When a girl gets married, dowry is exchanged. The standard dowry currently is: 12 cattle: 8 females and 4 males; 36 goats; and money depending on the level of education of the girl. For a Std 8 level of education, the amount ranges between Ksh70,000 and Ksh 100,000. For a form four level, it is Ksh150,000 and above. I know of a girl who works at Kenya Commercial Bank here in Mwingi. The parents of the bridegroom were asked for Ksh800,000! For a university level, the amount is unmentionable. But we don't have many cases of this level. In Machakos, they ask for 2 bags of maize, 1 bag of beans, 2 stalks of bananas, 6 cattle, 66 goats but no money, 2 pairs of sheets for the grandparents of both sides, and blankets for both parents. But one need not pay all in one go, instalments are allowed since dowry is a life-long process – since the relationship between the two families is also deemed to be lifelong.
>
> *Field notes excerpts from conversation with Mzee Mayai, Ngomeni*

The cultural milieu of choosing and undertaking adaptation practices can be understood through sociological institutionalism. The informal norms of communal pooling through helping one another or pooling resources together in kinship relations; norms of property ownership, mobility and decision-making provide for Hall and Taylors (2006) frame of meaning and hence guide action. Women choose to keep small stocks of livestock such as goats and chicken as that is the choice available within the norms of livestock ownership. Hesitance to sell livestock at onset of droughts is based on livestock's cultural value. This cultural value is socially constructed and hence the decision to sell fails to meet the economic rational choice.

6.4 Conclusion

The chapter explored the conditions under which households choose and operationalise the mix of adaptation practices to uphold their well-being. Emphasis was laid on conditions that influence the choice or dominance of particular practices as well as those that constrained optimal potential of the practices. The guiding hypothesis in the discussion was that adoption of adaptation practices is best understood through analysis of broader context of socio-economic and historical settings as well as cultural milieu embedded on the politics of general development, disaster risk reduction and humanitarian interventions in the region. The three parts therefore structured the study findings.

In the first part, the study established that socio-economic settings enmeshed in actions and inactions of structures of administration of development and humanitarian interventions limited the choices and effectiveness of household adaptation practices. Sub-optimal road transport status was linked to ability of households to harness mobility and market exchange as adaptation practices, while also curtailing efforts of diversification through increase in costs of production. Under-provision of electric energy and ever rising prices of petroleum-based fuels were viewed to limit households in diversification of adaptation practices. Limited

availability of water constrained households' time as well as financial resources as they had to either buy the water or invest in private investments such as shallow wells. Households were also limited in how they can grow crops: rain-fed versus irrigated agriculture. The study took cognisance of the arena under which existing status of water supply ran. It was noted to be one marked by camouflaged interests which keep the partakers active in water supply, thereby blocking any chance of focus on a comprehensive and harmonised water provision programme. The hypothesis that market failure has a hand in defining the conditions under which households choose and undertake adaptation practices was well captured by the undersupply of vital infrastructure and services. High economic costs of providing all-weather accessible roads, grid electric and water demotivated adequacy of their supply.

Lack of guaranteed, organised and regulated markets for principle households' produce was observed to conceive uncertainty thereby jeopardising market exchange as an adaptation practice. With formal marketing structures characterised with bureaucracy and corruption, the effectiveness of market exchange was compromised. Households had to choose between two undesirable market options – whether to take their produce to the NCPB or to middlemen. Either case left them as the losers. Similarly, the effectiveness of local enterprises was influenced by the general wealth conditions of the localities in which they are undertaken. With high poverty levels, its effectiveness was rated low.

The necessity of financial capital to support adaptation practices was noted. Availability of credit through micro-finance institutions appeared to overtly provide solutions to this necessity. Further probing established that many households hesitated to reach out for credit facilities to enhance their ambitions in diversifying their income-generating activities or expanding their strategies of storage. High interest rates, daunting eligibility conditions, low purchasing power linked to general poverty conditions and cultural inhibitions explained the paradox of availability of credit despite households' grievances of having no money to undertake adaptation practices. It was concluded that availability of credit was only a first step and the challenge laid in the details of its accessibility.

Humanitarian aid through distribution of food aid was a notable activity in the study region. When food aid was distributed without conditionalities, it was observed to have no strong relationship with the household adaptation strategies. There were weak linkages to adaptation practices of storage, communal pooling and market exchange. But when food aid was linked to conditionalities, for instance the food-for-work such as digging of terraces, then these were

abandoned as soon as the food was withdrawn. This means that there are instances when bench terraces are not a deliberate choice of households but influenced by accompanying incentives. It was observed that food aid, due to its conceptualisation, played a macro role of diverting attention from structures underlying households' capability to deploy and realise optimal benefits of adaptation practices. A remote link was also made between supply of food aid and private vested interests by actors involved in its supply. It is therefore not easy to directly link food aid with household adaptation practices, beyond the weak tie based on claims that it affords recipient households time to concentrate on preparing their farms or saves them from selling their assets such as livestock. It was hence concluded that the question of food aid should not be so much about whether it is good or bad in relation to enhancing household adaptations, but about the extent to which it camouflages private interests. This conclusion affords an affirmative acceptance of the hypothesis that food aid neither hinders nor facilitates households in undertaking adaptation practices. This does not mean that food aid is irrelevant in debates of adaptation practices. Its goals are short-term and limited to saving lives. Instead, it helps to qualify food aid as an indicator of a failure of household adaptation practices to uphold households' well-being.

In its second part, the study examined the path-dependent nature of household adaptation practices. Three things were prominently notable during the field work - bench terraces, community self-help groups and the theme of trees planting. Their historical background was related to their seemingly high popularity amongst households. Engaging in communal pooling through self-help or storage practices through bench terraces and tree planting are therefore a choice that is historically moulded and not an emergent characteristic of perceived changes in climate.

Culture-rooted gender biases were observed with regard to how men and women chose and undertook adaptation practices. Property ownership, mobility and decision-making were noted to favour men more than women. This cultural influence resulted in gendered adaptation options through mobilisation of existing gender roles and power relations between men and women. Attempts to address the inequalities therein were received as a challenge to the men's authority.

Livestock plays a central role amongst the Kamba. It is not only a store of wealth and a status symbol – hence, *wealth-on-hooves*; it is also the medium of cultural rite of marriage relationships through payment of dowry. The two cultural elements were linked to the perceived high

unwillingness of households to dispose livestock off at the onset of a dry season when pastures start to diminish. The optimistic wait and see attitude, with households hoping that the pasture situation would get better in coming season, resulted in emaciated cattle when the undesired scenario of no-rains-no-pasture unfolded. Consequently, there is distress sale of near-dying livestock at throw away prices. This cultural attachment to livestock therefore reduces the effectiveness of market exchange as an adaptation strategy and consequently confirms the hypothesis that *wealth-on-hooves* jeopardises household adaptation practices.

The socio-economic settings provide grounds for relating Giddens perspectives of power relations (1984) to household choices of adaptation practices and constraints thereof in undertaking these practices. Actors in administration of development and humanitarian interventions use their authoritative and allocative resources in a manner that determine which and how infrastructure goods and services vital to household adaptation practices are supplied. Monopoly infrastructures - roads, grid power and piped water are left to market forces of return-on-investment leading to their under-provision and under-maintenance. National Cereals and Produce Board uses its authoritative resources to determine how the people of Mwingi can take opportunity of market to sell their grains.

Figure 15 below summarises the three broad contextual factors that influence choice and constrain operationalisation of household adaptation practices discussed in this chapter. The lines linking food aid to adaptation practices are dotted to signify the weak bond relating them to household adaptation practices.

Having examined the adaptation environment of households and brought out the numerous constraints that surround the choice and effectiveness of households' adaptation practices, the next chapter seeks to explain how these constraints come to persist. It does so by cross-examining the practices of self-help groups through external influence.

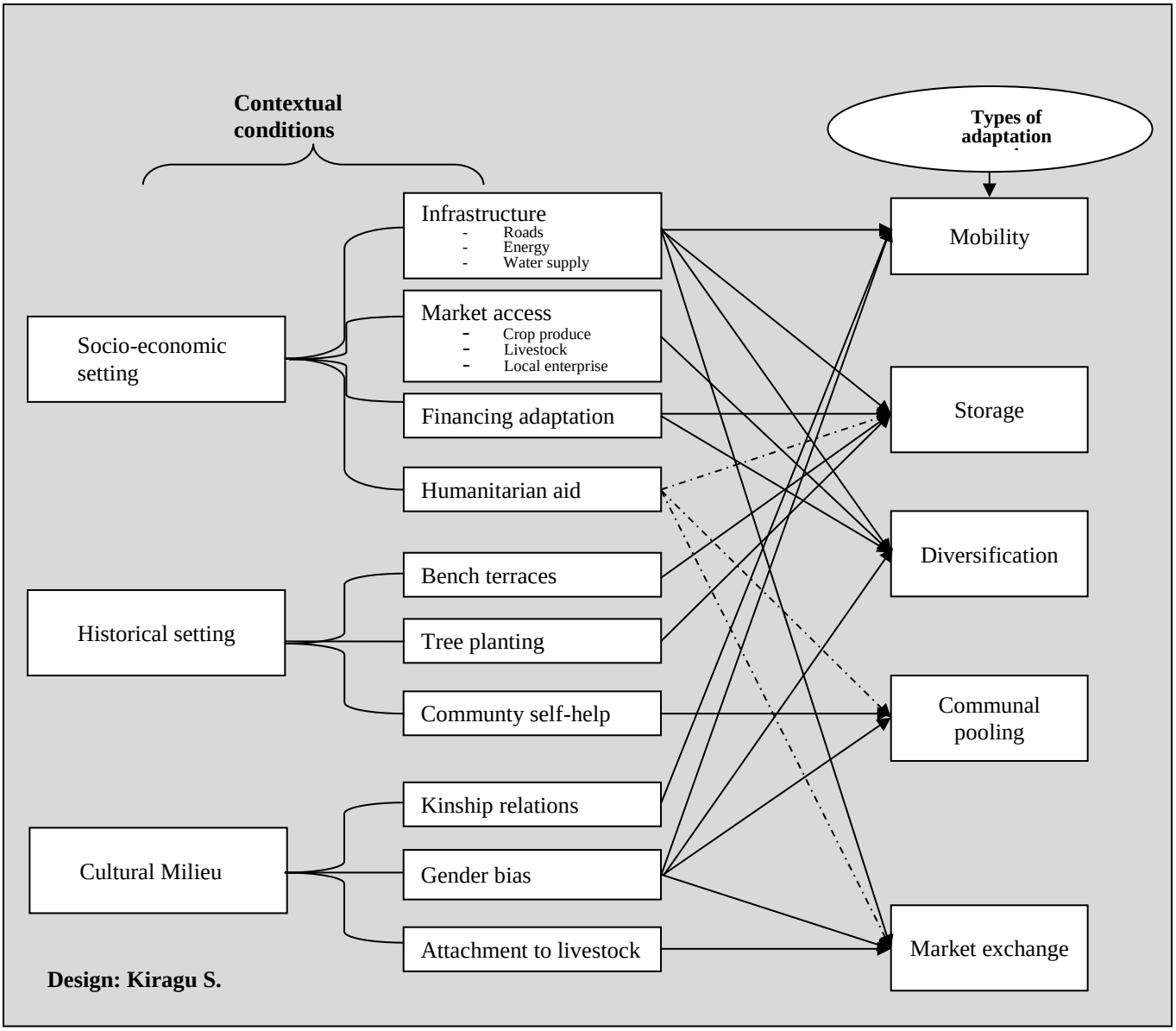

Figure 15: Contextual conditions influencing household adaptation practices

CHAPTER SEVEN

COMMUNITY SELF-HELP GROUPS – SITES OF EMPOWERMENT OR DISEMPOWERMENT?

"Empowerment espoused by community self-help is a rhetoric to obscure the true extent to which power remains in the hands of political authorities"

Herbert-Cheshire 2000

7.0 Introduction

The foregoing chapter brought out the main conditions under which households in Mwingi choose and undertake adaptation practices. It was demonstrated that these conditions are embedded in the wider social, economic, cultural and institutional spheres of society. Understanding the foundations of the conditions that constrain household in choosing and optimizing the benefits of adaptation practices requires a reflection on the power relations and practices between households and other actors. This chapter focuses on the last study question that seeks to find out how constraints to household adaptation practices are reproduced. It is based on the claim that self-help groups are sites and tools through which unequal power relations are played out thereby nurturing a status quo that makes constraints to household adaptation practices remain largely unaddressed and unchallenged. The practice of external actors working with households through self-help groups is therefore discussed with a view to tease out how unequal power relations are sustained in society. The chapter comprises two sections: the first details the concept of self-help and its contemporary use in Kenya; the second part delves into the practice of self-help and demonstrates the elusiveness to its intended community empowerment goal.

7.1 Self-help – Concept and practice in Kenya

7.1.1 The concept of Self-help

Self-help is a core concept in the field of community development and espouses "the premise that people do, can, will, and should collaborate to solve community problems" (Littrell and Hobbs 1989:87). It builds on local social capital and provides a practical problem-solving utility. Cheshire (2006) provides two variants of self-help. The first variant is self-help manifested through traditional activities of volunteering and mutual community aid. Merry-go-round, a term commonly used to describe the activity whereby group members pool resources for one member at a time in rotation till all members are served, has been in existence as a

cultural practice. Resources shared include labour, cash money or cash pooling for acquisition of household goods.

The second variant is that of self-help as an enterprise – normally with external facilitation. This particular concept of self-help is rooted in the argument that charity and welfare provision encourage dependency and provide no incentive for impoverished populations to improve their own conditions of existence (Smiles 1996) and has its origin in UK and Australia where formation of Rural Community Councils was facilitated to support local council activities after withdrawal of central government budgetary and services support.

The history of self-help and self-help groups in Kenya was introduced in chapter 6 section 6.2.3. In the contemporary practice, self-help groups have to be registered if they are to formally interact with external actors. At the offices of Ministry of Gender, Culture and Social Services[72], four categories of registration of community groups are available:

- General self-help groups: groups comprising of a mixture of women and men. This category puts no restrictions on leadership of the group compared to the others.
- Women's groups: for registration of a women's group, 70% of members must be women, and all of the leadership positions must also be held by women.
- Youth groups: these must comprise at least 70% youths (18-35 year olds), but not necessarily the leadership.
- Community-based Organizations (CBOs): these are umbrella groups which cover a larger area. They often represent a number of self-help groups who are then affiliated to them (normally to pool their resources). The CBOs have higher recognition by the government (and many NGOs) as access points to the community, and therefore can benefit from sources of funding that smaller groups don't have access to.

Although soliciting external support is a key motivation to registration of groups, there are those that register in order to make savings in the commercial banks and micro-finance institutions. The financial institutions require a form of statutory registration before a group can open an account. There are other groups which, due to the small scale nature of their operations, do not seek registration and instead run on their own terms and conditions without much interaction with the "official" world. These include labour-based merry-go-rounds and rotating savings and credit organisations (ROSCAs). Group members agree to meet at regular

[72] Naming of Ministries keeps changing as newly elected Government restructure sectoral departments with a few additions or subtractions here and there.

intervals and contribute funds that are given in turns to one or more of the members. Once every member has received funds, the ROSCA disbands or begins another round.

It is common for a self-help group to evolve into a CBO in order to attract larger scale support such as organised marketing of goods produced by the group members as well as larger amounts of funding. A case example is the Regional Institute for Social Enterprise (RISE) which comprises more than 68 women self-help groups and supports them to among others, market their weaving crafts to Italy, Japan, Netherlands and USA. Others take up micro-finance functions of lending to the groups that are members to it. Kitu/Mwingi Goat Breeders Association which comprises dairy goat groups initiated by Farm Africa have been providing loans to the member groups. The concept of farmer field schools (FFS) that is promoted by the Ministry of Agriculture closely borrows from self-help in terms of mobilisation, organisation and operations of groups.

7.1.2 Self-help groups in Mwingi

When the Kenya Climate Change Working Group visited Mwingi, self-help groups were their target of not only climate change awareness creation, but also soliciting community participation in the policy-making process of the formulation of a climate change bill which would later be tabled in parliament to become a law[73]. The KACCAL project currently under implementation in Mwingi has a multi-million shillings[74] component labelled "community-driven development", an approach it has inherited from its predecessor, the Arid Lands project. Under the community-driven development component, in both KACCAL and the Arid Lands Project, community self-help groups are supported to initiate their own priority activities under the framework of food security, climate risk reduction and income generations:

> "The Arid Lands Resource Management Project includes a substantial training program designed to increase the ability of communities in identifying, implementing and monitoring priority community investments.... The Special Climate Change Fund (SCCF) funding will enhance the Arid Lands Resource Management Project community capacity building program by integrating a long-term perspective towards reducing climate risk in strategies and investment choices at the community level. It will help communities identify activities that can mitigate the negative impacts of these risks through the development and application of specific methodologies under the PRA, appropriate training and awareness raising activities on climate change related risks and impacts, potential opportunities for increasing welfare".
>
> *UNDP 2009*

[73] Referred to as the Climate Change Authority Bill, it was passed by Kenyan Parliament in December 2012 but the president refused to append his signature citing lack of involvement in its creation. This was shocking particularly to the Kenya Climate Change Working Group which had organised hearings across the country during the Bill's preparation, including the one I attended in Kavuvwani, Mwingi.

[74] The third of the three KACCAL project components is "Community driven initiatives for climate resilience" budgeted at approximately US$400,000 out of US$1million for activities in Mwingi alone (UNDP 2009).

Other government departments, NGOs and private sector endeavour to work with community self-help groups to achieve their goals too. The Ministry of Agriculture supports community groups with technical and marketing support – hence the formation of groups such as Mango clubs and *Ndengu* (mung bean) clubs. Farm Africa works on livestock to support poor members of the community through dairy goat farmer groups to improve nutrition and income through upgrading local goat breeds. Micro-finance institutions facilitate creation of self-help groups to support access to credit.

Numerous households come together to work as self-help groups, addressing shared challenges, from labour, to micro-finance credit arrangement. In addition, they use the strategy of self-help to develop communal facilities for individual access or for the good of the disadvantaged, e.g. support to orphaned children. Some 70% of the household survey respondents had membership to at least one self-help group with women comprising a majority in the membership to the groups, at a ratio 61% to 34% men.

The dominant activity of the self-help groups is farming. Groups involved in cultivation mainly concentrate on vegetables and fruit-tree farming. For those dealing with livestock, goats and chicken are the predominant animals of choice. Group contributions go into buying each member some goats or chicken or the group engages in short-term purchase and sale of the livestock for profit making. Given that most of these groups comprise women, the choice of goats and chicken is an indicator of their decision-making boundaries defined by cultural gender biases. Another common activity is beekeeping. The beekeeping groups are important to the Ministry of Agriculture for promotion of modern apiculture techniques. A less popular activity but nevertheless also practiced by some groups is basket weaving. This activity is generally common in Mwingi West and Mwingi Central areas where there are still sisal remnants[75]. Some groups mainly by youth are engaged in making of building bricks. According to the household survey, 48% of the groups were involved in cash-based merry-go-rounds.

The benefits of self-help are at the individual level, but reaching out to work as groups aims to achieve what the individual cannot achieve on his or her own e.g. the micro-finance merry-go-rounds; or the desired facility does not make sense to have for one individual, e.g. building of schools or a common good e.g. support to orphans.

[75] Sisal production in Kenya has declined since the 1980s partly due to low fibre prices in the international market and partly due to importation and market take over by synthetic fibre bags.

In Mwingi, self-help exists in two forms: Self-help whose formation is internally-motivated, and depends on mobilization of resources from its members e.g. labour and money merry-go-rounds, funeral groups. The main objective is social welfare – members are able to support one another by pooling their individual resources together. Commercial/entrepreneurial orientation is not emphasised although a member can use the savings to start an individual or joint project with another person.

Mwingi has limited banking services[76] mainly concentrated in Mwingi town. Even where distance is not limiting, acquisition of credit comes with prequalification conditions that borrowers find difficult to meet. For instance, mainstream commercial banks require proof of a steady source of income and a form of security – normally fixed (e.g. land) or capital assets (e.g. a vehicle) which many individuals particularly women do not have. Merry-go-rounds allow members to save for a household need that requires lump-sum amounts. These may include school fees, buying assets such as livestock (especially goats for resale or bulls for ox-plough labour), or household goods such as a water storage tank and kitchen utensils. Another activity that is based on member contributions relates to unpredictable emergencies such as deaths and illness. Funeral self-help groups for instance make cash and material contributions to support a bereaved member to meet the costs of arranging a funeral. Some groups contribute and save money for purposes of meeting emergencies as defined by the members.

The other form of self-help is supply-driven and externally motivated, mainly by an external actor such as government agents, NGOs, the private sector such as micro-finance credit institutions. The self-help groups are formed essentially for the purpose of acquiring support availed by the external actors. The support is normally in form of financial grants and credit facilities, technical advice as well as provision of social goods (water points – earth dams, sand dams, boreholes, water pipelines, health centres) and services. The condition for the provision of support is the need for the people to be organised in groups.

In between these two, are variants of self-help that take characteristics of both to varying proportions. There are some whose formation is internally-driven, deals with issues agreed on consensus to be of concern to members. However, when an opportunity for external support arises, in form of funds, services or goods, they reach out for them. With and without external support, they continue with their core activities. There are those which are formed for the sole

[76] Kenya Commercial Bank (KCB), Equity Bank and Cooperative Bank are found in Mwingi town. It is not until 2009 that KCB set office in Kyuso town. As of the time of the research, all the other towns of Mwingi had no commercial banks.

purpose of accessing opportunities presented from external actors – they disband as soon as they have accomplished their mission or if they fail to accomplish it. There are also those that form to access opportunities created by the external actors and after the withdrawal of external support, they continue on their own, defining their interests in the course of time e.g. Kyuso fruit growers self-help group.

An additional observation is that of a category of entities within the local community who play a broker role of mobilising external support for the self-help groups without being members of the groups. Individuals with political positions of representation and working to retain and increase their popularity as well as leaders aspiring to increase their popularity often mobilise resources of their own or from external sources to support self-help groups. A participant of the Kavuvwani community workshop confided with the researcher that the person who had organised the community climate change hearing workshop and brought it to the rather awkwardly-located[77] village of Kavuvwani and not any other part of Mwingi, came from the area and had eyes on an elective political post. The participating groups which were mobilised from the whole of Mwingi would know him through such a gathering.

The discussion presented in the next section delves into scrutinising the nature of interaction between external actors and local people through the concept of self-help. By using a critical approach, the existence and operations of self-help groups are discussed with the view of examining the extent to which they contribute to persistence of factors that constrain households' capabilities in choosing and implementing adaptation practices effectively. While benefiting from numerous interviews undertaken with government officials, NGOs officials and leaders of several self-help groups, two cases of self-help groups – the Kyuso fruit growers and Ithumbi FFS provide the backbone of the discussion. Detailed data notes on the two groups are presented in the Appendix.

7.2 Why self-help is elusive

The role of the practice of self-help in Mwingi in constraining households' choice and implementation of adaptation practices can be understood by analysing the motivations, assumptions and implications of the practice particularly when external actors are the drivers of its propagation.

[77] Kavuvwani is located about 5km from Mwingi town, on the south-west direction from the town, a far distance in relation to all the other villages of Mwingi. For instance, it would take a person from Tseikuru not less than 2 hours to reach Kavuvwani.

7.2.1 Depoliticisation of livelihood improvement

The local people are aware of the apparent unequal power structures at play. They acknowledge that constraints are set not only by a variable climate to their agricultural production systems, but also by structural constraints as elaborated in chapter 6. They recount the political dimensions of these constraints:

> "...the root problem, to be frank is something very political. I have witnessed the three governments - Kenyatta, Moi & Kibaki's. And I have been a grown up. I have not seen a single government that has been committed to uplift the standards of living of people ostensibly because, when people remain poor, it is easy to manipulate them...the three governments have taken advantage of the poor. Even our political leaders here, are not of the idea that the poor be uplifted because they will lose a winning ticket to parliament. Unfortunately, the elections sometimes come when rains have failed and people are so desparate from the drought effects. So the politicians bring the food and say "you see, we help you not to die, so vote for me". It is a winning ticket and has made our people move backwards and nobody has addressed it. Our political leaders lack good will."
>
> *Migwani FGD*[78]

Yet the nature of support provided through the self-help approach is of a soft kind, one that is non-confrontational and attempts to ameliorate the situation than support overhaul of the status quo that keeps many of the local residents on the receiving end. In a project report covering July 2008-June 2009, the Arid Lands project documented the numerous community self-help groups it had supported – mainly with materials and trainings (See table 15 below). Community groups with water wells were supported with motorised water pumps to ease the labour of drawing water for small scale irrigation. Others were provided with drip irrigation equipment. Trainings comprised a variety of activities such as beekeeping (hive management and honey processing), grass seed bulking, aloe vera processing and soap making, dairy goat farming, fruit juice processing and packaging[79]. Groups comprising water management committees handling community water infrastructure such as earth dams, rock catchments, sand dams and boreholes were provided with leadership and management training skills in order to help them improve their management responsibilities over community infrastructural services.

Table 15: Self-help groups supported by Arid Lands project: July 2008-June 2009

Nature of training/ material support	**No. of Self-Help groups**
Dairy goat	15

[78] The participant who made this input is retired, having spent over 15 years working with a national research institute as a field assistant. Most of his contributions were in English laced with Kiswahili here and there.
[79] The author participated in one of these mango training sessions as a participant observer

Grass seed bulking	20
Bee keeping	13
Irrigation management	5
Fruit processing and packaging	2
Soil and water conservation tools provided	15

Sources: ALRMP Mwingi Annual Report 2009

This form of supporting local community groups is not unique to the Arid Lands project. Other government departments and NGOs replicate the same model for similar or different activities. What is characteristic of this support is the focus and emphasis on pragmatism and practical skills - dealing with livelihood challenges as they overtly manifest themselves in the day-to-day lives of the people, thereby blocking from sight the root causes of those challenges. When a community group sinks a well, it is because they have run out of options of obtaining the service from the state, which is best suited to provide or at least guide integrated and harmonised provision of piped water which is a natural monopoly[80] good. But the gesture of being supported to run a well is normally more than welcome to the group as it addresses an immediate need. The key point here is the tightly closed eye to the structural foundations of households' challenges. Since such a focus would need reflection of equity and social justice, and ultimately power relations, it seems that neither of the players is ready for critical reflections.

On the providers' side, letting status quo remain works to protect direct and indirect interests as well as inadequacies. When a politician for instance provides support for a water infrastructure in a village, he is praised for addressing people's basic needs (see photo 22[81]). But a critical reflection on why the water cannot be provided for all or existence of a plan to do so, for decades now, goes unchallenged. A neighbouring village needs to attract the support of their political representative through their votes. If they don't, they are unlikely to get water any time soon.

NGOs rights to work in a particular district need to be approved by the District Commissioner before they can embark on working with communities in an area. They have to declare their nature of work before they can get authorization, which can also be denied. As an administrator elaborated:

[80] Due to high start up costs, piped water distribution is best efficiently undertaken by a single supplier

[81] Women prepare a welcome dance as the local parliamentary representative arrives to officially open a water pipeline and storage tanks in Kyethani Village. The researcher, accompanying the Arid Lands project partook to the dancing, while observing the interactions between the local people and their leaders.

> ".. We have NGOs who don't recognise Kyuso as a district. When they are planning, they plan having Kyuso in mind as a division of Mwingi...we are not comfortable with that, and when they come here, we tell them no, we are not part of Mwingi, we are a district, operate from this district the way we want you to operate. We also have others who come into the district without duly paying courtesy to the district leadership so that they can be approved and so that they can tell the leaders of Kyuso what they want to do. They just go to the community and start doing their own things, but they don't go very far because many times, conflicts arise and this office is vested with one responsibility of conflict resolution. It must land here and when it lands here, then that's when somebody gets embarrassed..."
>
> *Kyuso district admin.*

Supporting politically neutral initiatives that make household livelihood marginally bearable is better than no initiatives at all, thus conforming to the adage – *half a loaf is better than none.* By not challenging the status quo, they have lee way to continue working in the area,

Photo 22: Women prepare a dance to receive a local politician coming to inaugurate a recently completed water piping project

Source: Author

maintaining jobs, supporting procurements and keeping donor funding flowing, the state apparatus and local community seemingly happy.

Before the introduction of structural adjustment programmes (SAPs) in the late 80s and early 90s which saw down-sizing of government expenditures in key social sectors, Kenya's arid lands had a history of neglect and inequitable development from the central government (see

chapter 3 on Mwingi and its larger context). Run by a leadership core from the agriculturally fertile central Kenya where coffee and tea were regarded as the kings of export market and foreign currency earning, eastern and north eastern regions of Kenya lagged behind in the provision of basic social services and infrastructure (Republic of Kenya 2008; Weiss 2004). Post-structural adjustment programmes and new central governance coming in, in 2003, seem not to have changed much so far. Inadequacies in funding and technical capacity continue to bog down the public sector service delivery to the households. The District Water Office for instance runs with a skeleton staff. Mwingi West (Migwani) has one Water Officer, a rather skeleton working desk (equipped only with a phone line) and no car for mobility in the field. The commonly referred to as mother district – Mwingi – has a Water Officer who is diploma-level trained, despite the position requiring a degree holder. Of the six districts existing at the time of this research, four did not have District Water Officers, and the two existing had to serve beyond their allocated areas of jurisdiction. They work closely with NGOs where they get support in terms to travel to field sites as well as subsistence daily allowances.

Working with groups is thus an economic necessity that not only minimises costs of reaching out target beneficiaries of services but also masks the inadequacies on the side of the government – what is required is to make an announcement through the local administration – District Commissioner, District Officer, Chief or Assistance Chief and village elder that these or that groups are required for some specified task. The performance contracts which form the basis for Government staff performance appraisal can then be fulfilled through demonstration of massive reach of large statics of community groups that have been provided with support.

Gramsci (1975: *In* Pelling 2011-91), with respect to social contract, believed that by offering marginalised populations the tools of critical thinking and the structure of organised groups to bring their distinctive cultures to bear in the production of counter hegemonic discourses, transformation change could be achieved. But why have the local households not united through the same medium of self-help groups to make transformative demands of the actors who superficially support them? Gramsci's observations of inertia can answer this question. That despite some acknowledgement by local people of structural governance challenges in the constraints to household adaptation, there is no popular support for pressure for change. As highlighted in chapter three, local political representation is perceived to have been unable to make real transformation in the region. The celebration of 25 years of representation in parliament by a local politician was thus received with mixed reaction. Beyond these sentiments, no signals of pressure for change and accountability are observable. Hence, the local

people seem to just sail with the situation and take small advantages when opportunities arise. As an area with a long history of external interventions in the context of climatic calamities – be they droughts or flash floods, the word *Mradi* which is Kiswahili for projects, connotes an opportunity whose length is not finite and has to be made use of while it lasts. You have to help yourself while it lasts. As one respondent narrated "...these people come and go[82]" referring to the project initiatives and their short life spans of one, two to three years. Those who have participated in Government or NGO *Mradi* activities recall some of their experiences with nostalgia, as a respondent reminisced:

> "I tell you, these people were spending a lot of money. There was one time we went for one week. We were accommodated in Thika, in a storey hotel building. They catered for everything. The sleeping room had everything – even a bathroom inside! When you come back from field, you would go to the bathroom and shower. Even in the morning, when you wake up, don't touch the bed, leave it!...(loud laughter...) and it was a whole week!. We had four Nissans, for the farmers! Then the officers had the company vehicles - four of them too. And food..., you would eat what you want..and if you don't want goat meat you say what you want. You see that was a lot of money. Image hiring a Nissan for a whole week!"
>
> *Kamusiliu FI*

The local community has therefore become complacent with the situation they find themselves in and try to just fit in therefore reproducing it. Pelling, relying on Gramsci (1975) captures it:

> While the benefits for social contract extend only as far as the bourgeois periphery, its universalistic language is produced and disseminated across all society so that those subservient to the social contract are also caught up in its reproduction" (Pelling 2011:91).

Many years of a discourse of climate, specifically drought impacts being the cause behind people's woes, resulting in poor harvests, low incomes and impoverishment, have justified interventions that address the impacts of drought and over time enrolled the local population into the same discourse, blocking alternative perspectives that would enlist alternative solutions. From a path dependency view, children have grown to become adults, watching Government or NGO vehicles crisscross the local landscapes to implement *Miradi*[83]. As adults, when then asked to make recommendations for projects to be supported in, they come up with those they have seen or heard being implemented before, in the neighbouring village or elsewhere – making choices from within a box whose content has been historically determined.

The creation of a donor-recipient relationship played out through the "we the endowed experts with resources verses you the poor beneficiaries" does not make the playing ground any level. In a food security assessment study undertaken by a mix of district government technical staff

[82] Interview with Kamusiliu FI
[83] Plural of project, hence projects

as well as staff from humanitarian NGOs, a plenary discussion highlighted the unequal power relations as a technical staff expressed his disillusionment of working with the local population:

> "..these are people who are frustrated. It is a class that requires a lot of counselling. You cannot just kick them out of the programme. They are lowly looked at in the society. Even in the meetings they don't speak out. They need to be managed separately. But if you dump seeds to them, it won't work, they don't think of tomorrow, they live today. They should be taught separately (or should we whip them....(laughter.....) if you don't plant, we won't give you anything....This is a class that does not even belief in itself. They belief they are doomed by fate. They belief they are born poor and will remain so. They think they are destined to stay poor..."
>
> *FSAS Feb 2010*

As receivers, the local people have to be grateful for what they get, and they get what is available. The Kyuso Fruit Growers Group had to formulate a project around fruits because that was the nature of support available. During an interview with a district administrator, inflexibility of already packed projects was evident. As he narrated how projects with the local people were formulated:

> "We sensitise the beneficiaries once the Government projects are in the district. We don't take the money directly to them, and we don't impose on them, we go to them and ask their opinions. We organise a stakeholders meeting, tell them we have this.., it's your money, tell us how to go about it, tell us where you want the boreholes..if the money is for boreholes... (*I asked the possibility of diverting the funds if at that moment the local people said their urgent need was food*)... Under Government procedure that can be difficult to reallocate. Unless with some authority. It can be difficult..."
>
> *Kyuso District Admin.*

With the receiver being the one in need, being too confrontational may lead to being sidelined or left out altogether. "Taking on" the system that gives you the survival oxygen then does not feature as a possible option, at least so far. Using Rogers (1987) perspectives, it can be argued that the existence and promotion of self-help groups as a medium for improving people's well-being without explicitly recognising or tackling the equity and justice vertices embedded in power structures characteristic of the approach, its promoters themselves become part of the problem. As he puts it:

> "It seems a harsh judgement to conclude that the attempt to ameliorate the symptoms of the disease are in fact simply a contribution to the maintenance of the problem.
>
> *Rogers 1987:7*

Hence, the government, NGOs and self-help groups are in the business of finding working solutions to perceived problems on the ground and not rooting out deep-seated causes. The local people, despite the knowledge of the nature and roots of their problems, seem to be giving up on ability to make any change, a situation they note is not only in Mwingi but also in other parts of Kenya. The following excerpts from of a focus group discussion capture this disenchantment and helplessness:

FGP1: "... Politicians have a lot of muscle here. These officials who work here - the DC, the senior Government officers..they have to dance the tune of the MP.."

FGP2: ....In the community, we are given an opportunity, in the committees... when there is funding, its brought here and it is announced. But the way of using that fund is the problem. Like this sand, it is possible that the CDF[84] gave a cheque for it. But the community is requested to bring the sand and are not told that there is money for it. Then someone will value the sand and the money is put aside. That is the problem.

FGP3: ....and there is little we can do about it, *sisi ni wadogo sana – hatuwezi* (We are small people, we cannot – *change the situation)*. We are small, and they are the bosses, they are employed, they have jobs. When the funds come, the community should be called and told to form a committee. They can open their own account and manage the funds. If there is mismanagement you will arrest the culprits. But how can this happen when in the committee they (government officials) are also members, who will investigate who? That is the problem that we have here Mama (*referring to the researcher*). DC or chief, should not be part of the committee that oversee community funds management - but the minute you have the DC, DO, Chief[85] in a committee, it can't work. At the end of the meeting, the chairman (a community member) is left behind discussing with the Government officers. The construction stalls and all the money is finished."

Migwani FGD

7.2.2 A drop in the ocean

While it cannot be denied that worthwhile support from the government and NGOs has been channelled through self-help groups and has been helpful, it would be unjustifiable to overstate success in getting local households out of poverty traps which curtail them from harnessing the full potential of household adaptation practices. Although communication from the Government and NGO officials paints an image of success whereby many households have been reached through self-help groups, feedback from the households indicates otherwise. The penetration of support remains low. Respondents of the household survey were asked if any of the self-help groups they belonged to had received external support. Only a 25% said they had, with the most popular support being planting materials - hybrid seeds. Others included donation of exotic goats to the dairy goat groups, the improved "Kenya Top Bar Hive", technical advice, trainings as well as financial support.

In addition, support given to any one group is normally too small to substantially make a transforming change to a households' economic status which is what it aims to do. A training here, some water pumps there and some soil conservation tools there, is unlikely to make a significant difference in the households' well-being both in the short and the long run. In the case of non-repayable grants, only small amount can be channelled to each qualifying group and there is no guarantee of a group receiving subsequent support. For the profit-oriented private sector, loans for running businesses are evaluated according to the size of the undertaking

[84] CDF – Constituency Development Fund – An allocation to constituencies from Central Government for use on priorities identified by the local populations

[85] The Provincial administration wields a lot of power in the nation's governance structure – they have the power to arrest and remand. They are the President's representation in their areas of jurisdiction.

and can be as low as Ksh5,000 (€50). In effect, the support is ineffective in size when matched against the households' welfare needs. Consequently, in practice, the existing form of self-help somehow makes life only marginally more agreeable, though on paper there is always high acclaim of how successful the groups are.

Farm Africa appears however, to handle its interaction with self-help groups differently – first by initiating a process for handpicking those regarded as the society's "the poorest of the poor" for group formation and secondly by working with those groups for at least five years during which period, they support the groups with training and materials for dairy goat rearing.

7.2.3 The entrepreneur in every community member

Food aid, which is a common feature in Mwingi is viewed by some as crippling the local people's ability to be independent of external support. External actors talk about a dependency syndrome that needs to be broken so that people can care for themselves without looking up to humanitarian support from Government, NGOs and well-wishers. In this scenario, self-help is romanticized through narratives that emphasise reduction of dependence and promotion of self sufficiency through support of small income generating farm and non-farm based enterprises.

Some 16% of the survey respondents belonging to a self-help group, run or have attempted to run a small business, the common ones being selling cereals, buying and selling of goats, making soaps, juices, running tree nurseries or running a small kiosk for household goods. The private sector, particularly micro-finance institutions also see community self-help as the best way to reach the millions at "the bottom of the pyramid". This *bottom* has been shunned by the bigger financial institutions as a risk group that is not profitable to do business with. Towards the end of the 1990s one multi-national bank (Barclay) closed many rural branches as they become unprofitable to run. They could not do much business with the poor. Of the poor, women constitute the majority. Women have historically been disadvantaged when it comes to accessing credit as they traditionally do not own capital assets required as security when securing credit – e.g. cars and land. The micro-finance institutions capitalised on this gap by devising credit security arrangement through community self-help. Members of the group guarantee each other to get security. To access this credit, the group members must be involved in some form of business either as individuals or as a group:

> Each member must have a business plan however small. This could be cultivation for trading with the produce, a livestock business or chicken rearing and selling. We help them grow from small businesses to

> big businesses. The first loan is between Ksh5,000 to Ksh 50,000. After that, they can graduate to qualify for Ksh100,000. The loan goes to the individual. Each applicant is assessed according to their business. The average borrowing amount, especially in Mwingi North constituency is between Ksh10,000 to 15,000.
>
> *KWFT staff*

Self-help groups are therefore ostensibly viewed as incubators for stimulating entrepreneurship which would in turn provide members with capacity to improve their economic well-being. While indeed making positive impacts on members based in the town centre of Mwingi where the livelihood production characteristics[86] are different from those in the rural setting, its impact on the rural groups is questionable. One challenge is the assumption of an entrepreneur in every individual. The strategy presupposes that every community member has a vision, skills, education and charisma of running a thriving business enterprise. In reality, majority of groups undertake subsistence activities, operating at too small a scale to achieve efficiencies. They thus end up making meagre earnings if any. Some 68% of survey respondents who had taken credit either from their own groups or from MFI narrated difficulties repaying as scheduled citing too little earnings from the businesses they had invested the money in. Majority of the 26% that had no problem had the credit serviced through external arrangements by salaried spouses, sons or daughters working outside the home.

Given the small amounts[87] provided to the members, it would be unreasonable to expect miraculous exponential growth of enterprises. Similarly, these micro businesses target their neighbourhood as the market catchment to sell their chicken, honey, *Aloe vera* soaps, shampoos, mango juice and tree seedlings. When every other group member is selling soap, the market catchment is soon saturated and the stock piles. This compares with what Boudon and Elster in Giddens (1984:311) refer to as perverse counter-finality effect that result from the intentional acts of a plurality of individuals. Worse is when the drought comes and many households limit expenditure to only the bare survival items like food and school fees – soap can wait – nobody died of bathing without soap. The neighbourhood is already financially deprived given the poverty levels. Therefore purchasing power is averagely low. The result is death of the enterprises as owners are unable to sustain the businesses that cannot even pay for the loans which normally attract high interest rates[88] compared to mainstream commercial

[86] The urban population livelihoods are based on non-primary production activities – salaried employment, trading and even higher levels of education etc. Their purchasing power is therefore higher than that of the rural folks.

[87] The average loan provided to starters at KWFT is between Ksh10,000-15,000 (€100-150)

[88] At the time of the empirical data collection, April 2010, one micro-finance institution was charging between 20% and 18% interest per annum, with smaller amounts, below Ksh100,000 attracting the higher rate.

banks. Indeed, the smaller the amount borrowed by the group members, the higher the interest rate. They consequently turn to their assets and sell them to service the loans thus eating into the very asset resources they were to increase.

Needless to say, 50% of credit obtained within or from external institutions is channelled to school fees, even though the applying members purport to channel the funds to business. In Mumoni, a group of women narrated how they split up the money and only met at designated times of the month to bring together collections for the loan repayment. For the MFI, what is important is that the money is returned.

7.2.4 Exclusion

External actors' romanticisation of community livelihood improvement through self-help groups takes an uncritical assumption that members of the community are homogenous and share the same level of needs, abilities and interests. Yet the approach is inherent with exclusionary elements with the very poorest, said to be the target of support edged out of the circles of such support.

i. Self-selection

Many of the groups are formed through self-selection. Neighbours, friends or relatives come together to address a common need or come together to take advantage of external support pledged to target organised community groups. This method has low probability of inclusion of individuals who might deserve the support most. Yet as is noted in literature, the poorest in society are unlikely to be captured in the groups as they have characteristics that make them unfit for the groups. Examples can be drawn from two case examples presented in detail in this chapter: the Kyuso Fruit Growers group and Ithumbi FFS. The Kyuso Fruit Growers group was initiated through a collaborative project of Kenya's Forestry Department and Belgium Technical Corporation. The project wanted to work with the community through organised groups, under any theme on trees. The group founder went around scouting for members interested in the formation of the group. From the background information about him, he is not an average Mwingi resident – he runs a well-stocked shop and has a thriving farm through heavy investment in water harvesting (see Photo set 23 below). It would be naive to expect that he would look around for members who cannot share his vision of growth such as heavy investment in water harvesting. The Ithumbi FFS already existed before the support by the Ministry of Agriculture came to them. Again the members had self-selected themselves. Notable is that these groups have leadership from the local elite. The Ithumbi FFS chair is not an ordinary rural woman; she is wife of a teacher. The secretary to the Mikuyuni group is a teacher, while the chairlady is wife of a retired army officer.

Photos 23: Akyusoli's water harvesting and storage infrastructure
Source: Author

ii. Membership conditions

The stringent conditions of membership can deter interested members. The groups have rules that entail monthly contributions and monthly attendance of meetings. These requirements may not be affordable or feasible to all potential members. Some members of the community are therefore cut out from joining or cannot sustain membership. The Kyuso Fruit Growers group requires a monthly contribution of Ksh100. Any member aspiring to join this group has

to pay up arrears of contributions since the start of the group. Similarly, those at the limit of livelihood survival are busy trying to make ends meet on daily basis and are not able to afford the time required to support self-help meeting demands.

iii. Patriarchal system of control

Although group formations in the villages, particularly by women appear a natural thing, it is not necessarily so. Membership has to be vetted by husbands, as participation involves not only household's financial resources but also time. One respondent said he lets his wife join groups but is aware of others who do not. This self-help group approach cannot on its own overcome entrenched patriarchal system of control within a society (see Chapter 6 section 6.3.2).

iv. Literacy requirement

Obtaining support from external actors requires that community groups have to write proposals that fit what the funders have pledged to support. There is a general correlation between level of education and level of poverty, with those at the bottom of the poverty ladder being also of lowest levels of education or none at all. The requirement for writing proposals, mainly in Kiswahili or English (as the officials assessing the proposals may not necessarily come from the local community) renders an exclusionary element as those who cannot read or write can only play a minor role in the groups if they are members. They can only trust that their interests are catered for in the proposals as the writing has to be spear-headed by those with some basic literacy abilities.

The running of the group itself requires records keeping, roles that are normally undertaken by the literate members of the group. Trainings require that members have note books to record important information. The Ithumbi FFS had trainings running over one year and every literate member was required to have a notebook and a pen during the theory classes held every Monday.

Even where basic literacy levels are achieved, proposal-writing is a technical skill requiring detailed thinking through the nature and life of an undertaking and every step in budgeting. This task although from an outsider eye looks empowering as local populations directly take decisions of activity planning and financial budgeting, has its limitations. For instance, important steps or components are forgotten, causing undertakings to stall. Operating costs of water pumps such as spare parts and diesel are a common problem as group members get

back to their external supporters to ask for spare parts or request for a fuel budget as they did not plan for how such costs were going to be handled.

v. Discriminate support

Because external actors' support is channelled to groups or to individuals who move out to seek such support, those not members to the groups miss out. Group members are supported with technical skills and provided with goods and services as per agreement. Many narrate of learning experiences through exchange tours, conferences and field days. The government itself is even forthright in working with either groups or those who seek its help, a policy that excludes those unable to be members of groups or seek individual support, normally a preserve of prominent farmers:

> ".....you can't force someone to dig (sic: *to cultivate*) unless he sees the need to... you know nowadays it's like you are begging somebody...this is your farm, it's to your own benefit, *lima, lima hivi, lima vile* (cultivate, cultivate in this manner or that). But where we find a farmer who is willing to learn, then he is really assisted in terms of technical support so that he can be an example to the others.
>
> *District Admin. - Mwingi West*

7.2.5 Community as a haven of cooperation

Working with community self-help groups takes an assumption of a haven of cooperation entrenched through the social ties and social capital of members. For a community group to achieve its communal goal, the members have to cooperate. But this cooperation cannot be taken as given. The Ithumbi FFS group knows this too well, as one of their members chased them out of a communally cultivated plot. The members had cultivated for a year, during which they invested in a water well, soil conservation terraces and manuring. The harvest was good. The owner of the land, the host farmer, quit the group and withdrew his offer of land to the group. He retained the well, since the members could not take it away with them. This scenario was mentioned to be common amongst groups especially if the communally operated farm starts to perform well. This affects the sustainability of the group operations as land tenure is not guaranteed.

The very approach to targeting women self-help groups, however noble, is another case exemplifying the sensitive nature of cooperation within a community. Women-only self-helps target women as beneficiaries, to make credit, skills and income opportunities available to them. Micro-finance institutions enable women to access credit by having other women members of the group as guarantors to the credit. Exclusion of husbands in the process to be involved only at the signature stage can result in conflicts within the household. Many men in the society are ill at ease with their women having money that they themselves cannot access. In addition, when one woman defaults payment, the conflict is transferred to the households

of the other women who have to step in to pay for her. In Ngomeni division, the area administrative head (Chief) recounted how she had severally arbitrated family disputes arising because of money provided to women through self-help groups. Either the husband wanted to access that money by force, or the woman could not pay and had sold a household asset to repay the loan without consultation with the husband.

Internal conflicts within the groups are also not uncommon. The Mwingi Drought Monitoring Officer narrated how a water pump for supporting Wikithuki group in Tseikuru to irrigate, was withdrawn due to non-use. Conflict amongst the group members had diminished any further potential of working together. The conflict revolved around an extra-marital relationship.

Working with community self-help groups therefore assumes outright cooperation from the intra- to inter-household levels, ignoring the power relations embedded at each level.

7.3 Conclusion

This chapter focused on examining how constraints to household adaptation practices were reproduced. It sought to elaborate the claim that self-help groups were sites and tools through which unequal power relations were played out thereby nurturing a status quo that made constraints to household adaptation practices remain largely unaddressed and unchallenged. It reviewed the practice of external actors working with households through self-help groups to reveal how unequal power relations were sustained. From the empirical analysis, it was established that formation and existence of most community self-help groups in Mwingi was supply-driven, as external actors – governmental, non-governmental and private sector attempted to fulfil their mandates in volume dimensions. Through organised groups, they were able to reach more people than when targeting individuals. Their overt claims were to empower the local population to be self-reliant, by improving their production methods and diversifying income sources. They did so through provision of technical skills, extension services, financial credit facilities as well as capital (water pumps, fruit processors) and infrastructural assets (boreholes, wells). These forms of support were provided under specified conditions of organisation of the groups. A cursory glance at progress reports and communications from the external actors portrayed a rosy picture whereby there was a lot of support for the local community and now the responsibility rested on the local people's shoulders, to take advantage of it. However, a closer look into the nature of support and the intricate details of groups operations revealed invisible power dynamics at play.

While the selling points of working with self-help groups revolved around a discourse of empowering vulnerable dryland communities, improving their asset base and its productivity as well as capacity building to engage in productive livelihoods, the underlying motivations and assumptions thwarted the achievement of these objectives. Beyond the rhetoric of community empowerment was the subtle and veiled unwillingness to address the structural bases of vulnerability that relate to power relations and redistribution of resources starting from the macro governing structures. As Herbert-Cheshire (2000:211) puts it:

> "Empowerment espoused by community self-help is a rhetoric to obscure the true extent to which power remains in the hands of political authorities"
>
> *Herbert-Cheshire 2000:211*

Governmental departments were crippled with inadequacies in staffing and operational resources. NGOs dared not take a confrontational stance in their support to the local populations lest they lost governmental approval of operating in the region. The private sector, particularly micro-finance institutions are profit driven and their eyes were sharply fixed on the health of their balance sheets. The support to the community through self-help was in itself too small, scattered and uncoordinated, thereby rendering itself difficult to evaluate beyond the numbers of training workshops held or water pumps distributed.

Assumptions of entrepreneurial abilities of community members contributed to eating up the very assets they were aimed at improving as small start-ups are unable to service expensive loans and eventually collapsed. Household assets would consequently be liquidated to off-set the loan balances. As a result, the loans were increasingly being shunned. The assumption of the local community as a homogenous group, a haven of cooperation that self-organises itself flawlessly as and when required posed obvious possibilities of exclusion of the very vulnerable groups that the approach claimed to target. Self-selection of membership, stringent membership conditions, internal conflicts and patriarchal controls determined who joined the groups, who remained and who did not. Literacy requirements and skills for funding proposal writing discriminated against groups which could not fulfil these requirements. Those not in groups and those who were not able to reach out for the external support remained outside of coverage ring.

On the whole, it was concluded that it was inadequate to define contextual vulnerability of local populations only on economic terms and ignore broader framework sets of needs that enable growth of incomes such as basic education, public health, infrastructure such as roads, water and electricity, which in combination, provide conducive environment for increasing

productivity and consequently income and better positioning to manage and/or endure climatic and non-climatic stressors. These cannot be left to the households to organise through self-help. They have to be nurtured through what Sen (2000) refers to as "a process of expanding the real freedoms that people enjoy" entailing social, cultural and political freedoms. On these grounds, it is concluded that it is highly unlikely that the approach of self-help, whether for mainstream development or adaptation to climate change policy and practice, is going to deliver the highly desired robust households that can uphold their well-being in the face of climatic and non-climatic stressors.

Consequently, the recent arrival of adaptation to climate change discourse to the local level with an increased motivation for communities to step up self-help organisation for the purposes of being empowered to manage the ensuing climate risks may be but yet another medium of maintaining the status quo of contextual vulnerability while protecting vested interests and power relations. The findings also confirm the hypothesis that the practice of self-help through community groups facilitated by governmental and non-governmental, private organisations and even politicians may be contributing to masking and maintaining imbalances of power relations.

This however does not downplay the potential to be realised in external actors working with community groups. What it intends is to highlight that, assumptions of the group ideology can result in unintended consequences and outcomes. According to Giddens (1984:27), the flow of action produces consequences which are unintended by actors. In the case of external interventions, it is not the intention of the organisations involved to exclude some members of the community and thereby exacerbate the people's vulnerability. However, their approach results into such an unintended outcome.

It would indeed be erroneous to rule out the potential of self-help in favour of individual-based adaptation practices. There are seemingly successful cases of adaptation practices by households that do not engage in self-help groups. These cases afford to go it alone because they are at a high socio-economic status level. In Mwingi West (Migwani), a household had a greenhouse, four grade cattle and run a hardware shop in Mwigani town. Further inquiry revealed that the household head had a degree in commerce, had worked for a timber company as a marketer and had finally settled down in his home area to do business. In Yenzuva, the respondent was a diploma graduate of Jomo Kenyatta University of Agriculture. He had trained in horticulture. When he failed to secure a white collar job, he settled in his home vil-

lage and started farming. His farm was smartly laid out, with deep bench terraces. He grafted his own mangoes. He had, at the time of the visit, dug his own earth dam. When asked where he got all the knowledge he applied in his farm, and specifically how to make the earth dam, he responded that he had been reading from magazines and wanted to put the knowledge into practice The photos no.s 23-26 illustrate the respondent's farm.

Many of those who form self-help groups are not able to go it alone for various reasons that are socio-economic in nature. What is important from the foregoing discussion is the need for consciousness of unintended consequences of actions by external actors.

Photo 24: Mangoes planted at the base of a bench terrace

Photo 25: A privately owned earth dam under construction

Photo 26: A run-off water collection tank *Source: Author*

Photo 27: A run-off water collection and cleaning point

Source: Author

CHAPTER EIGHT

UNDEVELOPED ADAPTATION

8.1 Summary of findings and conclusions

This study set out to understand household adaptation practices in the face of climate risks with the overarching aim of offering an alternative conceptualisation of adaptation that is not limited to climate risks and is applicable at the level of rural farming households. The study sought to address the overarching question: How can adaptation by households in the face of climate risks be understood? To elaborate this main question, the study sought to examine the perception and role that climate plays in the lives of the people of Mwingi; the adaptation practices they engage in, with the aim of supporting their well-being; the factors determining choice and constraints to undertaking these adaptation practices and finally the reproduction of the constraints.

As a background to addressing the overarching study question, chapter two and three introduced the theoretical as well as contextual foundations of the study. Specifically, chapter two introduced the key concepts of the study, reviewed empirical studies and theories on capacity and choice as a basis for formulating a conceptual framework and research questions. As to key concepts of the study – adaptation and vulnerability – the argument aimed to arrive at operational definitions by sieving through their diverse usage by a variety of disciplines. Adaptation by households was defined as actions and processes that enhance the ability of households to uphold their well-being in the face of climate risks. Vulnerability on the other hand was conceptualised as contextual and operationalised as factors that influence the capacity of households to anticipate and manage impacts of external stressors. These factors are embedded in the socio-economic, cultural, institutional and political settings within which households experience external stress. In the second part of chapter two, the aim was to review empirical studies on adaptation in order to tease out their conceptual grounding. It was established that many of the studies limited themselves to a focus on climate stimuli as their starting point thereby problematising adaptation in a narrow way. Where they covered factors determining success of adaptation, they were inward-looking – at household characteristics such as age, income and size of farm, while steering away from the sensitive arena of social processes involving governance, equity and justice in resources allocation and decision-making. The knowledge gap was therefore identified as the limited focus on explanations of household adaptation practices and constraints from perspectives of social processes embed-

ded in social structures. The last part of chapter two focused on the theories of capacity and choice. It picked on tenets from Amartya Sen's capability approach and Anthony Giddens' structuration theory as well as insights from new institutionalism in order to support formulation of a conceptual framework and research questions.

Chapter three positioned the study in its biophysical and social settings. It was observed that although drylands comprise a huge percentage (80%) of Kenya's land area and their biophysical characteristics have a bearing on rain-based livelihoods, socio-political factors also play a vital role in defining the vulnerability context and subsequently ability to adapt. Historical colonial land alienation for large-scale commercial farming as well as creation of protected areas – parks and reserves – deprived agro-pastoral and pastoral-based livelihood communities access to vital land-based resources. A history of unequal national resources distribution was linked to market failure whereby drylands have been regarded as uneconomical for investment in public goods such as roads and water. The biophysical challenges were therefore noted to interact with the socio-political aspects to define the vulnerability of drylands communities. It is from this context that households were observed to make adaptation choices. Resulting disasters such as famine and conflicts were therefore regarded in light of Wisner *et al.*'s Pressure Release model where natural hazards intersect with root causes, dynamic pressures and unsafe conditions of contextual vulnerability to result in disasters (2004: 45-78).

Chapter four explored in depth the data collection methods used to operationalise the study questions in the field. Qualitative methods comprising of focus group discussions, key informants and expert interviews as well as observation were the main tools of data collection. A survey was also included to embellish the qualitatively collected data. Data analysis process was also highlighted. The chapter also presented the procedure of conducting the field work. Challenges involved in the operationalisation of the data collection tools and how these challenges were overcome were elaborated.

Chapter five was the first of three chapters that presented the empirical findings of the study. It sought to understand households' perceptions of climate and impacts of climate risks on their well-being. First, the study sought to establish whether the local people distinguished between climate and weather and the changes thereof. It was found that there was no distinct or significant difference in the way the two were perceived. Indeed, as stand-alone terms, they were found to only exist in the English language while in Kiswahili or the local tongue, Kikamba, one term describes both the long-term as well as the short-term weather conditions.

The difference was only discernible in the temporal description – the "weather of this place" to mean the long-term average, and the "weather of last year" to denote shorter-term weather conditions. From these observations, it was concluded that climate variability is not a new phenomenon in Mwingi, considering that it is a dryland region and that people are well aware of this variability over time and space.

An enquiry on whether the local people already perceived climate change received mixed reactions on descriptions of change. Respondents claimed that there were changes and went on to cite examples of changes they had observed in the last five years. The concept of change in their perspectives did not therefore conform to the science of climate change in temporal standards. Theirs was recent and linked to hardships experienced during recent extreme weather conditions. Precipitation was the main climate element featuring in local people's description of changes in weather. Drought and rainfall were the representation of absence and presence of precipitation. Droughts hence spelt the main climate risks that local people experienced and lived with. There was no significant difference between the way the local people of Mwingi perceived climate variability and climate change. Instead, drought was the most perceived risk, irrespective of whether it was from "change" or "variability" of the climate. This finding confirmed the hypothesis that households perceive climate through the role of weather in their livelihoods and that climate change or climate variability are merely theoretical categorisations. The difference between these two concepts gets blurred in the lived worlds of the local people. This was grounded on the observation that approaching the field through "change" and "variability" appeared subjective and did not elucidate objective or coherent responses. Furthermore, perceptions of change are closely linked to memory. Yet, memory is a poor reflector and tool for discerning and distinguishing climate change and variability, for it is influenced by a myriad of non-climate factors such as time, age, extension support and macro market factors of liberalisation among other factors.

In its last part, chapter five explored the impacts of climate risks, and specifically impacts of drought, to the well-being of the people of Mwingi. It was established that drought impacts resulted into three forms of crises - domestic water crisis, food crisis and livestock wealth loss crisis. Based on Sen's capability approach, these resultant crises affected critical household functionings namely: being able to produce food, being able to conveniently access water, being income secure and being able to secure social status in society – like owning livestock and marrying. For adaptation debates to be meaningful and relevant to households, it was concluded that they must be able to link closely with these functionings. This means that they

cannot reasonably afford to exclude themselves to focusing only on the direct characteristics of climate risks and impacts.

The chapter also identified the practices that households deploy in order to support their well-being in the face of climate risks. Agrawal's (2010) categories of adaptation practices proved useful and sufficiently broad to capture the strategies households use to circumvent the dents made by droughts. These were: mobility, storage, diversification, markets and communal pooling. From perspectives of the capability approach, these adaptation practices were operationalised as the range of possible capabilities of upholding household well-being in the face of climate risks. The analysis of household adaptation practices using these categories confirmed the usefulness of employing an inclusive methodological approach rather than one limited only to the characteristics of climate risks. The observed adaptation practices were noted to go beyond the realm of climate studies and to spill over into development arena. It was therefore concluded that debates of adaptation should not be "silo-rised" as a preserve of climate experts if adaptation practices are to be of value to local people's well-being. The claim that the goal of adaptation need to be seen in the context of upholding households' well-being was therefore confirmed.

Chapter six explored the conditions under which households chose and operationalised the mix of adaptation practices to uphold well-being. Emphasis was laid on conditions that influence the choice or dominance of particular practices as well as those that constrain deployment and/or realisation of optimal potential of the practices. The results were structured and discussed under three parts. In the first part, the study established that socio-economic settings influenced household choices and effectiveness of adaptation strategies. These socio-economic settings provided grounds for relating Giddens (1984) perspectives of power relations to household choices of adaptation practices and constraints thereof in implementing these practices. Actors in administration of development and humanitarian interventions used their authoritative and allocative resources to determine which and how infrastructure goods and services vital to households' adaptation practices were supplied. Monopoly infrastructures such as roads, grid power and piped water were left to market forces of return-on-investment, leading to their under-provision and under-maintenance. Difficulties presented by the status of roads were linked to the ability of households to harness mobility and market exchange as adaptation practices, while also curtailing efforts of diversification through increase in costs of production. Under-provision of electric energy and ever rising prices of petroleum-based fuels were viewed to limit households in the nature and diversity of adaptation practices they

could engage in. Limited availability of water constrained households' time as well as financial resources as households had to either buy the water or invest in private projects such as shallow wells. Households were also limited in how they could grow crops: rain-fed versus irrigated agriculture. The study took cognisance of the arena in which water supply was undertaken. It was noted to be an arena that is marked by camouflaged interests, which kept the partakers active in water supply, thereby blocking any chance of focus on a comprehensive and harmonised water provision programme. The hypothesis that market failure had a hand in defining the conditions under which households chose and undertook adaptation practices was well captured by the underprovision of these infrastructures.

Lack of guaranteed, organised and regulated markets for principle households' produce was observed to bring about uncertainty thereby jeopardising market exchange as an adaptation practice. With formal marketing structures characterised by bureaucracy and corruption, the effectiveness of market exchange was compromised. For instance, the National Cereals and Produce Board (NCPB) was noted to use its authoritative resources to determine how the people of Mwingi could take opportunity of market exchange as an adaptation option through selling their grains. Households thus had to choose between two undesirable market options – whether to take their produce to the NCPB or to brokers. Either case left them as losers. Similarly, the effectiveness of local enterprises was influenced by the general wealth conditions of the localities in which they are undertaken. With high poverty levels, their effectiveness was considered low.

The necessity of financial capital to support adaptation practices was noted. Availability of credit through micro-finance institutions appeared to overtly provide solutions to this need. Further probing established that many households hesitated to reach out for credit facilities to enhance their ambitions in diversifying their income-generating activities or expanding their strategies of storage. High interest rates, daunting eligibility conditions, cultural inhibitions and low purchasing power linked to general poverty conditions explained the paradox of availability of credit despite households' grievances of having no money for implementing adaptation practices. It was concluded that availability of credit was only a first step and the challenge laid in the details of its accessibility. This observation aligns with Sen's assertion that a set of commodities (in this case availability of credit) cannot reasonably count as an indicator of freedom as long as the quality of conversion factors is not taken into consideration (1985).

Humanitarian aid through distribution of food aid was a notable activity in the study region. When food aid was distributed without conditionalities, it was observed to have weak relationship with the household adaptation strategies. However, when linked to conditionalities such as digging terraces, then these terraces were abandoned as soon as the food was withdrawn. This means that there were instances when bench terraces were not a deliberate unconditional choice of households but a choice influenced by accompanying incentives. Additionally, it was observed that food aid, due to its conceptualisation, played a macro role in diverting attention from structures underlying households' ability to deploy and realise optimal benefits of adaptation practices. A remote link was also made between supply of food aid and vested private interests by actors involved in its supply. It was therefore concluded that the question of food aid should not be so much about whether it was good or bad in relation to enhancing household adaptation, but the extent to which it camouflaged private interests. This conclusion allowed for confirmation of the hypothesis that food aid neither hindered nor facilitated household adaptation practices. However, this does not mean that food aid is irrelevant in debates of adaptation practices. Instead, it helps to qualify food aid as an indicator of a failure of household adaptation practices to uphold households' well-being. Its goals are short-term and limited mainly to saving lives.

In the second section of chapter six, the study examined the path-dependent nature of household adaptation practices. Kenya's historical colonial and post-colonial policies and practices were linked to the popularity of bench terraces and tree planting (storage) as well as self-help groups (communal pooling) among households. This influence was understood in the light of historical institutionalism (Steimo 2008). Over the years, institutions of soil conservation and community development through self-help continue to influence households' behaviour in choosing adaptation practices. The historical context, from which these institutions emerge, provides the frame of preference formation for adaptation practices. Engaging in communal pooling through self-help or storage practices through bench terraces and tree planting were therefore concluded to be choices that were historically moulded and not an emergent characteristic of perceived changes in climate.

The last of the three sections of chapter six focused on the cultural milieu of household adaptation practices. This cultural milieu of choosing and undertaking adaptation practices was understood through tenets of sociological institutionalism. Two kinds of norms provided for Hall and Taylor's frame of meaning (2006) and therefore guided adaptation action: (i) the informal norms of communal pooling through helping one another or pooling resources to-

gether in kinship relations; (ii) norms of property ownership, mobility and decision-making. Women chose to keep small stocks of livestock such as goats and chicken, for this is the choice available within the norms of livestock ownership. Hesitance by households to sell livestock at onset of droughts was linked to their cultural value as *wealth-on-hooves* and as medium of cultural rite of marriage relationships through payment of dowry. The optimistic wait and see attitude, with households hoping that the pasture situation would improve in a coming season, resulted in emaciated cattle when the undesired scenario of no-rains-no-pasture unfolded. Consequently, there was distress sale of near-dying livestock at throwaway prices. This cultural attachment to livestock therefore reduced the effectiveness of market exchange as an adaptation practice. Therefore, the hypothesis that attachment to *wealth-on-hooves* jeopardised household adaptation practices was confirmed. It was concluded that this cultural value is socially constructed and hence the decision to sell fails to meet the economic rationality propagated by rational choice proponents. This adds more impetus to grounding adaptation debates on people's life-worlds.

The last of the empirical findings, presented in chapter seven, focused on examining how constraints to household adaptation practices were reproduced. It sought to elaborate the claim that self-help groups were sites and tools through which unequal power relations were enacted, thereby nurturing a status quo that made constraints to household adaptation practices remain largely unaddressed and unchallenged. It reviewed the practice of external actors' interaction with households through self-help groups to reveal how constraints to household adaptation practices were reproduced. It was established that formation and existence of most community self-help groups in Mwingi were supply-driven, as external actors – governmental, non-governmental and private sector organisations attempted to fulfil their mandates in terms of volumes. Through organised groups, they were able to reach more people than when targeting individuals. Their overt claims were to empower the local population to be self-reliant, by improving their production methods and diversifying household income sources. They did so through provision of technical skills, extension services, financial credit facilities as well as capital (such as water pumps and fruit processors) and infrastructural assets (such as boreholes and dams). These forms of support were provided under specified conditions of organisation of the groups. A cursory glance at progress reports and communications from the external actors gave the impression of a rosy picture according to which there was a lot of support for the local community and now "the ball laid in their court" - to take advantage of the support's availability. However, a closer look into the nature of support and the intricate details of the operations of groups revealed invisible power dynamics at play.

While the selling points of working with self-help groups revolved around a discourse of empowering vulnerable dryland communities, improving their asset base and its productivity as well as capacity building to engage in productive livelihoods, the underlying motivations and assumptions thwarted the achievement of these objectives. Beyond the rhetoric of community empowerment, it was concluded that there was subtle and veiled unwillingness to address the structural bases of vulnerability that relate to power relations and redistribution of resources starting from the macro governing structures. Government departments were observed to be crippled with inadequacies in staffing and operational resources. NGOs did not dare to take a confrontational stance in their support to the local populations lest they lost approval of operating in the region. The private sector organizations, particularly micro-finance institutions, are profit driven with their attention sharply fixed on the health of their balance sheets. The support to the community through self-help was in itself too small, scattered and uncoordinated, thereby rendering itself difficult to evaluate beyond the numbers of training workshops held or water pumps distributed. Assumptions of inherent entrepreneurial abilities of community members contributed to the collapse of enterprises the members started, subsequently rendering them incapable of servicing expensive loans advanced to them. Household assets were then liquidated to off-set the loan balances thereby depleting the very asset base the enterprises were intended to improve. As a result, loans were increasingly shunned. The assumption of the local community as a homogenous group, a haven of cooperation that self-organised itself flawlessly as and when required, posed possibilities of exclusion of the very vulnerable groups that the approach claimed to target. Self-selection of membership, stringent membership conditions, internal conflicts and patriarchal controls determined who joined the groups, who remained and who did not. Literacy requirements and skills for funding proposal writing discriminated against groups which could not fulfil these requirements. Those not in groups and those who were not able to reach out for the external support remained outside of the coverage ring.

On the whole, it was observed to be inadequate to define the contextual vulnerability of local populations as being based only on economic rationalities, while ignoring broader sets of needs that enable growth of incomes. These broader sets include basic education, public health, infrastructures such as roads, water and electricity. In combination, these provide conducive environment for increasing productivity and consequently income and better positioning of households to manage and/or endure climatic and non-climatic stressors. Households cannot redress these frame conditions through self-help. They have to be nurtured through what Sen (2000) refers to as “a process of expanding the real freedoms that people enjoy”

entailing social, cultural and political freedoms. On these grounds, it was concluded that it is highly unlikely that the approach of self-help, whether for mainstream development or climate change adaptation policy and practice, delivers the highly desired robust households that can uphold their well-being in the face of climatic and non-climatic stressors. Therefore, the recent entry of the dominant adaptation to climate change discourse into the local level with an increased motivation for communities to step up self-help organisation may be but yet another medium of maintaining the status quo of contextual vulnerability while protecting vested interests and power relations.

The findings of chapter seven supported the hypothesis that the practice of self-help through community groups facilitated by governmental, non-governmental, private organisations and even politicians may be contributing to masking and maintaining imbalances of power relations. This however does not downplay the potential that can be realised in external actors working with community groups. What it intends is to caution against uncritical use of the group ideology as such use has potential to result in unintended consequences and outcomes. According to Giddens (1984:27), the flow of action produces consequences which are unintended by actors. In the case of external interventions, it is not the intention of the organisations involved to exclude certain members of the community and thereby exacerbate people's vulnerability. However, their approach results into such an unintended outcome.

8.2 Implications on theorizing adaptation

Given the role played by climate in household well-being and considering that climate is not the only stressor that households face, it is prudent that debates around adaptation, particularly at household level, be not limited to assessments of the characteristics of climate risks. By doing so, they exclude perspectives of, and remain unrealistic to the life-worlds of the people largely presumed to be negatively impacted by external stressors in general and climate risks in particular. This, as has been demonstrated, can be reversed by changing the approach in adaptation studies. Instead of starting with a focus on climate risks, they should start with a focus on well-being of the people who experience the impacts. Adaptation, conceptualised through household well-being, is attractive for the following reasons: first, it resonates with local people's needs irrespective of their priority ranking of household risks, be they climatic or non-climatic. A well-being-based approach offers flexibility and multi-edged win. Secondly, this would contribute to resolving two conceptual challenges of adaptation under the dominant debates: (i) the burden of proof that adaptation practices are indeed conceived with climate risks in mind, considering that the households have to deal with multiple stressors; (ii)

the question of whether people are adapting to climate change or to climate variability. Lastly, it allows for critical reflections on the social processes that interact with the natural world, thereby constraining the ability of households to uphold well-being in the face of climatic and non-climatic stressors.

8.3 Methodological implications

Conceptualising adaptation through the well-being of households has methodological implications. In chapter two, it was pointed out that the dominance of quantitative methods in adaptation studies was motivated by the approach that starts with climate stimuli as the focus guide to adaptation. This climate impact-based approach limits the depth to which adaptation at the level where climate risks are experienced can be understood. The approach has also meant that adaptation studies have been limited to natural science experts who can analyse, regress and interpret complex rainfall and temperatures data, model crop performances under changing climate regimes, design structures for weather monitoring and develop new crop cultivars. The local people are then mobilised and made aware of the changing climate conditions and what they can do about it. Approaching adaptation from the perspective of well-being invites not only a new set of methodological tools to adaptation studies, but also adds the array of expertise in the debates by increasing the inclusion of critical social science perspective. This provides a window for real inter-disciplinarity in climate change adaptation studies. A well-being-based approach offers a broad and rich range of issues central to the nature of socio-ecological systems.

8.4 Policy orientation

A well-being-based approach to adaptation by household, has institutional and governance policy implications. The climate impact-based approach to adaptation has in the past justified the hosting of institutional, governance and leadership of climate adaptation debates in the hands of environmental departments of governments, inter-governmental and non-governmental organisations. This is based on the origin of the climate change debates which started as meteorological issues. A well-being-based approach leans towards the field of development. Indeed, this approach would join emerging perspectives that link adaptation to sustainable development. It would imply a need for co-leadership in governance of adaptation policy.

From the findings presented in this thesis regarding adaptations practices by the rural households of Mwingi, it is evident that: climate risks are a normal part of the local livelihood; im-

pacts of climate risks cannot reasonably be separated from impacts by other changes; households make effort to deploy a mix of adaptation practices; and, the choice and effectiveness of these strategies are constrained by social structures embedded in the socio-economic, institutional, political, and cultural settings of the society. These elements of social structure render the full potential of adaptation strategies to remain unrealised and therefore undeveloped. Consequently, the adaptation practices of households manage to only keep the local population alive in the face of external risks in general and climate risks in particular. For adaptation policy to be meaningful and relevant to the local people, it needs to focus on these constraining social structures in a coherent way in order to develop a platform on which adaptation practices can provide value to households' well-being. By so doing, vulnerability would be reduced, and local households would consequently have the capacity to adapt their livelihoods for climatic and non-climatic stressors.

8.5 Areas of further research

Despite the proliferation of 'adaptation' projects being implemented by government and NGOs at the local community level, there is a dearth of critical research that challenges the way in which adaptation is conceptualised and operationalised at the local level. This research has identified and analysed some of the social constraints that are involved in household adaptation processes but usually not brought to the fore for critical reflections. However, the research scope did not allow for in-depth analysis of interactions pertaining to each constraint. Further in-depth research into these social factors would provide more specific and detailed insights. For instance, they could lead to a better understanding of how market failure affects different households.

Due to expansive size of the study area, it was not easy to reach some remotely connected villages, which neighbour the national reserve as well as the district border with Tana River. Although issues of conflict were discussed in the community meetings, the information was not detailed enough to understand the dynamics and intricacies involved. Conflicts as they relate to household adaptation as well as connect to macro social processes deserve further focus.

The climate change institutional frameworks of the government were mentioned in the study but were not explored in detail. It remains an issue of further research work to identify the ways in which they organise to translate adaptation from global to local levels. Although it is clear that the government organisations take climate stimuli as their starting point to guide adaptation, a critical review of specific policy designs as well as the practices of various gov-

ernment ministries, departments and agencies would help to link the challenges of household adaptation at the local level to weaknesses in the national policy strategies.

This study has succeeded only in unearthing social structures that constrain household adaptation capabilities. There is therefore opportunity for research to explore options for positively influencing these social structures.

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Appendix - Case examples of self-help group operations

Case Example 1: Kyuso Fruit Growers self-help Group.

This group, comprising of 18 members engages itself in growing of fruit trees. It was started in 2004 through a collaborative project of Forest Department (then under Ministry of Environment and Natural Resources) and Belgium Technical Corporation. I am in Kyuso town. I have come to visit Akyusoli, the chair-person of the group. I have been referred here by the staff of Arid Lands project. They have recently supported the group and are of the opinion that this group is doing a good job. I start at Akyusoli's farm, which right adjacent to the town – about 100 members. Akyusoli's family runs a shop here in Kyuso town. He is not originally from here. He is of Somali origin. His father migrated to this place over 20 years ago. They speak Kikamba fluently. Apart from running the shop, Akyusoli is a popular local farmer in this neighbourhood.

I am impressed by the first sight of the compound. It is unusually green, given that neighbouring fields are brown in colour, from the sun-scotched soil. The large compound hosts two well finished houses and a large water tank for rain water harvesting. I ask that I want to meet Akyusoli who is called from inside the house. I greet him and after a small talk they start going around the farm. There are huge bench terraces and at the bottom base are Mango and papaya trees. Lavish sweet potatoes are planted on the bench top. Pumpkins abound. Different types of green vegetables dot the gardens. It's unbelievable that the land can be this productive. At one side of the land, next to the access road is a big dam for storing run-off water. There is on the side an on-going attempt to expand the storage by widening the hole. It is this water that sustains the crops during the dry season. Since Akyusoli has to get back to the shop, we hurry up around the farm. Details of this undertaking will be provided when we are at the shopping centre so that he can man the shop. In the meantime, I learn that the piece of land is 2.5 acres including the homestead. The land does not touch the river on the lower side.

Akyusoli also informs me briefly about the group. They plant fruits as individuals but come together for learning and exchange. Once every month, they visit a member and see the fruits the member has grown, record yields and discuss the challenges he may be experiencing. Together, they process the mango juice and sell within Kyuso. So far, their product sells only in Kyuso since there is enough local demand. When they exhaust their own mangoes, they buy from the market – those coming from other regions like Hola irrigation scheme. However, on the farms they are diversifying the types of fruits that they grow. Nowadays they have papaya, custard apple (*Matomoko)* and Passion fruits.

We walk to the shop, 100m away and start our discussion. So how did it all start? It all started in 2004. The Forest Department (FD) in collaboration with the Belgium Technical Cooperation came around with an agroforestry project. They said they wanted to implement the project through community groups in clusters. The local community was requested to form groups and identify trees of interest that they wished to be supported in. Akyusoli went around and mobilised people who were interested and got 12 people. After discussions, the members-to-be said they wanted support in fruit trees.

The support they were to get was in form of a loan not a grant. They had to pay 30% of the proposed project in cash while they would receive technical support and materials – chemicals and planting seedlings from the FD. Two of their members wanted *Mukau* (*Melia volkensii*), but these they not available. They were refunded back their money.

From the loan in materials, the repayment was in cash. The repayment was to start after a grace period of 3 months and would last between 1-2 years depending on the individual's ability. They liked the idea because they would plant in individual farms and they were being helped to begin.

I enquire why it was important to have groups yet the activities were to be implemented by individuals in their own farms and not shared farms. He said the funders wanted the people to be together so that they can be monitoring. They would come every 3 weeks. The members also guaranteed one another. They were trained on how to plant and transport. Land preparation involved digging of a 3x3ft hole. They started smoothly but on the way they started experiencing challenges. All the members started with mangoes, the seedlings of which were delivered by FD. They had to sign contracts for this project after paying in 30% of the cost calculated per acreage of planting. Some of the seedlings seemed to have been premature for transplanting. Many of them dried. Akyusoli says he was working on half an acre for this project. Of the 78 seedlings that he planted, 40 died. For some of his colleagues, all the plants died!

With this initial failure of take-off, they complained and were given replacements of the dead seedlings. However, these too did not also fare well – while some still died, others were attacked by diseases. Others simply did

not grow. They complained again but this time they did not get replacements. The other problem was the chemical that they had been provided with. They had been informed that when they mix it with fertilizer and soil it would configure the soil moisture content and the mangoes would grow quickly. However, this was not to be. They actually wondered how possible this was going to be after there is no water in the soil. However, the Kenya Forest Service assured them that all was going to be well. There later came a time when the soil around the plant turned white after all the water had been sucked. The trees started to die. They suspected that the project sponsors were experimenting with the chemical without telling the community. They felt cheated since they continued to lose their trees yet they were still repaying the loan. They had invested money and labour into this undertaking. Akyusoli had personally spent Ksh14,000 on labour. Later, there seemed to have been some misunderstanding between the Kenyan Government (read KFS) and the Belgians and the project was wound up prematurely. The government suggested that KREP bank takes over the management of the repayment of the loans and threatened to sue those who did not pay back. By then they had already paid over 50% of the monies. The project lasted for about a year. During the period, they were given training on planting and taking care of the mangoes.

In 2006, the group members met and reflected on the project. They had the dilemma of whether they should continue or not. After some deliberations, they decided to proceed to work together. They approached the Ministry of Social Services and registered their group. They did not want to break the group although they felt they had been cheated. After all, they had been taught and according to them, the problem was the chemical that had been distributed, which had taken up all the moisture, leaving the land dry hence their plants dried. So they decided they would not use that chemical. They dug out the soil in the 3x3 ft holes and throw away the soil. They started afresh and bought their own mangoes as individuals. They approached the Ministry of Agriculture which procured the seedlings from Kenya Agricultural Research Institute (KARI) Embu station at Ksh80 per seedling.

The registration with the Ministry of Culture and Social Services required that a group had at least 15 members. They had to recruit more since they were 12. After mobilisation they got 18 more and became 30. They would advice the new members on how to prepare holes, put manure or fertilizer and ensure proper watering. They would meet once in a month at each member's farm in rotation. They would look at how far a member is, how many mango plants, how they are doing and the problems arising. In the course of time they observed some challenges such as diseases. They discussed the problems. They started with pest control, in close liaison with Ministry of Agriculture. They were advised to use chemicals. However, some people could not afford the commercial chemicals. There was a project by an NGO - Arid Lands Information Network (ALIN), on non-chemical pest control and some of their group members were pilot farmers. The non-chemical pest control was introduced to them – it involved use of leaves such as those of aloe vera and finger euphobia. The main problem was termites and powdery mildew disease. They would take the leaves and crash them, then mix with water and detergent. That's how they managed the pests and diseases. Those with financial ability would use the commercial chemicals since while non chemical control is cheap, it is labour intensive.

They also made rules for the operations of the group. The first one was that a member had to have at least 30 mango trees. This way they had to kick out those who were not serious including those who were not attending the monthly meetings. They stabilised at 18. At the time of the interview (April, 2010) every member had reached harvesting stage and started reaping the benefits of their efforts.

Through the interaction with the Ministry of Agriculture, they had learned about value addition. They got information that Arid Lands project was helping community groups. They applied to ARID LANDS PROJECT for a juice processor in the beginning of 2009. Towards the end of the year, they were informed that their application had been accepted and they would be assisted with the processor. The processor arrived in early January and they were given training on how to handle it. By then they had already sold their mangoes. The mango season in the area starts in late November and by December the market is flooded. They opted to buy from the market. They used the cash they had in the bank and bought the first lot of mangoes for the trainings. This money was from the monthly contributions. With this, they made 27 litres of mango concentrate. In the second round, they made 47 litres which they sold in a week, right there in Kyuso. Since then, after processing, every member carries 10 bottles of half litter. In their villages, they advertise and sell. They continued with the processing until there were no more mangoes in the season. To sustain production, they buy the mangoes coming from Hola (irrigation scheme).

What responsibilities members do members have, I ask Akyusoli. The group runs a *Merry Go-Round* which is compulsory. Each member has to contribute Ksh100 per month. Rain water harvesting is also required of every member. Majority have wells while a few have dams. The other responsibility is to terrace their farms. Recently, they also started agro-forestry - every member must have trees around his house compound and where one can, also plant around the fence. A recent rule has been the involvement of partners – Husband/wife. The group realised that non involvement of partners was limiting the operations of the group. If they visited a member and

he/she was not present, the partner would not step in to fill the gap. So they decided that every member involve their partners and briefs them of the progress of the group. This way, even when a member is unable to attend a function, the spouse can step in with full information.

Currently, the group comprises 8 males and 10 females. For the organisational structure - they have a committee of nine members - chair and vice, secretary and vice, treasurer and vice and members. In terms of external support, they have so far received from ARID LANDS PROJECT. In 2009, they applied and received funding from the Ministry of Culture and Social Services - Poverty Eradication Fund. Every year, the Ministry provide money to groups. They give a grace period of 3 months and a repayment period of 1 year. The funds are meant to support groups to engage in income generating activities. They received Ksh120,000. However, they used it as a micro-finance amongst members. They would loan the members at 20%. What the individual member would do with their loan is not of concern, so long as they remit back the monthly payment. They have finished paying and they were planning to get another loan. The Ministry provides the money at 15% interest, of which 7.5% is given back to the group after the completion of repayment.

They also work closely with the Ministry of Agriculture. All their members are linked to ALIN. Through ALIN, they have been able to get more exposure and experience on dryland farming by attending workshops, conferences and field days[89]. Their members have been to Ngarua for an exchange tour on water harvesting, kitchen gardening and vegetable growing. To Tanzania and Uganda, ALIN sponsored one member each to attend a conference. To Mutomo (within *Ukambani*), a few members attended field day on indigenous knowledge and indigenous trees.

I ask Akyusoli why he considers his group to have been successful. In his opinion, the members have managed to create confidence amongst themselves. Through working together, they are able to take care of their families long after the harvest season. Earlier, they had no techniques of water harvesting. Currently, the members fields look different from their neighbours. However, the neighbours are slowly copying the activities of the group. The Ministry of Agriculture has also been encouraging the local community to visit Akyusoli's group members to learn.

Akyusoli also thinks that their success is also rooted in the strategy of their work – each member makes their individual efforts in their own farms, as opposed to a group farm where labour is contributed communally. With a communal farm, labour sharing is normally problematic as individuals' priories their interests first before those of the group. The approach also ensures that individuals make their own harvest. Therefore, there is no room for conflicts which abound communally run undertakings as some members feel justified to get bigger shares of proceeds due to the unequal contribution of labour. What they get as a group is only loans, services of extension officers, information from other organisation and support from NGOs.

For them, an important element has been the sharing of knowledge and information. Those members who are good at grafting help the others. If a member has a problem, they go to his/her farm and review the case. It is possible that another farmer has had the same problem before and is able to advise on how to resolve it. If a member requires a certain equipment such as a sprayer and does not own one, those member with sprayers help out by bringing their sprayers during the meetings.

Has everything been that smooth? I ask Akyusoli. Not quite, he tells me. There has been over-expectation from the people outside of the group. Some make unrealistic demands. Some want to join the group but are not ready to meet the laid out regulations before admission. For instance, an aspiring member must pay up back-dated contributions that members have paid since the registration of the group. They must be already growing fruits and have invested in water harvesting. These rules are set to ensure that the group does not admit joy riders. However, there have been many groups that have been formed, doing the same initiative of fruits. However, many break up soon. Akyusoli feels that it is lack of commitment that makes them break. His key message thus is commitment. That a group without committed members will not achieve much. Secondly, Akyusoli lays emphasis on the moderation of the group discussions. The leader of the group has to create an atmosphere for appreciation of member contributions. Each suggestion is listened to and compared to others. Members are then given choices of what works for them. Not every suggestion works for everybody so members are not forced to standard solutions. Akyusoli gave me an example of a case where they were exploring the best way to water the mangoes – with a drip bottle or simply supplying 20 litres in one go. Members were divided on the better of the two. While the bottle is economical in water dispensing, the water in the bottle is heated up causing death of plant roots. The problem could be ameliorated by digging the bottle deep into the soil and keeping it upright. All in all, members had the choice between the bottle and the 20 litre jerry can.

[89] A field day is a term used mainly by the Ministry of Agriculture to refer to showcasing farming best practices and providing agricultural information in a site outside of their urban-based offices

I ask Akyusoli what the future of the group is. He is of the opinion that the way forward is to go into irrigation since droughts are getting more frequent and one cannot farm without water. They are thinking of improving their water technologies. They have thought about greenhouses[90] though it is too expensive an undertaking. However, it maximises on water, he contends, and moisture is conserved. They are also keen to improve on wells. However, their biggest drawback is salinity of the water. They wonder how it can be resolved. The level of salinity varies. The water they have at the town is from a borehole, good for domestic but not for agriculture. All in all, water will be their saviour if farming is to really take root in this region.

What achievements has the fruit growers group made so far? I probe. The group has managed to buy a plot of land at the town centre from the savings and contributions (*he breaks to attend to a customer*). The amount for the purchase was the accumulation of the monthly member contributions and the savings from the sales of mango concentrate. From the sales, a percentage goes to the individual and another percentage goes to the group account. In addition is the interest obtained when money is loaned to members. The plot of land was purchased at a cost of Ksh80,000. The Group wishes to establish their fruit processing operations on this space as well as have an outlet, a small restaurant and a conference hall which can used for training and even renting out. The already have an architect working on the plan and bill of quantities (BQ).

Case Example 2: Mwingi Central Ithumbi Farmer Field School

I visited Mama Rosemary the chairlady of Ithumbi Farmer Field School (FFS) in Ithumbi village. I came to meet the members of the FFS. They meet every Monday, at the chairlady's who has offered cultivation land as a host farmer. Mama Rosemary is wife of a retired teacher. They have a nicely finished semi-permanent house. She has been trained severally by various institutions including the Ministry of Gender and Social Services, on among others, leadership skills. Last year but one (2008), she was sponsored to take a three months leadership course at Jomo Kenyatta University of Agriculture and Technology (JKAT). She is a leader in many fora in the locality. I talked to her about her FFS and its operations. The other members are busy weeding the group farm.

The FFS activities started in 2000, she informs me. By then, the group already existed for one year. The Ministry of Agriculture (MoA) officers approached the group with the idea of the FFS programme. They had to be trained on good agronomic activities such as seed selection, planting, harvesting and post harvest management. The focus of the training was to orient their farming activities to commercial, income generation by "consider farming as a business" as opposed to subsistence production.

Before the FFS, the group was operating two *merry-go-round* activities: monthly cash pooling and assisting each other with farm work. They would meet on Mondays and Thursdays. Under the FFS, they would meet once, on Mondays, for training facilitated by an extension officer from MoA. Practical training was undertaken by establishing a demonstration site on land donated by one of the members referred to as the host farmers. Different farmers would host different activities.

If the activity involves cultivation, the members would make terraces on the offered piece of land, apply and plant their choice crop. They would then monitor and record growth performance. The training itself lasted for one year. Every member had to have a book. "After the farm work which is practical, we would get into a class session for theory. We would write down notes", she informed me. In addition to cultivation-oriented activities, they were also trained on chicken and goat rearing. Money for buying the chicken, planting seeds and farm chemicals came from the MoA during the one year of training. Records keeping was emphasised throughout the period for purposes of monitoring performance.

After one year, the group held a field day as part of their graduation ceremony. They were also requested to volunteer four members who would initiate new FFS as trainers. This original FFS was referred to as the "mother FFS". Public meetings were used as fora for mobilization of members for new FFSs. The use of farmers trained by the MoA to train other farmers is a core element of the FFS – it is referred to as "farmer to farmer extension". The process would be replicated in subsequent years. At the time of the meeting with the Ithumbi FFS, there were 6 new "daughter" FFSs.

[90] Greenhouses are structures constructed with plastic or glass roof, used for growing plants. They derive their comparative advantage with open air farming from controlling plant growth conditions – air and water; and protection against pests and diseases.

Since the one year support by the MoA, the Ithumbi group has been active and has even revived its original activities. With the MGR, they were buying members plastic seats[91] in turns. Before, they had bought cups and plates. Although the group had 60 members during the year of FFS training, it currently runs with 17 members. According to the chairlady, some members started relaxing and exiting. I was curious on how the group shared its harvest after production. In case of the group tree nursery, which had paw paws, mangoes and shadow (non-fruit) trees, they would be shared out equally amongst members to plant in their individual farms. Any remainder seedlings would be sold and money used to buy chicken or goats for the group. For the cereal crops, half of the harvest is shared equally amongst members while the other half is sold and money deposited into the group's account in the bank. The group is registered with the Ministry of Gender and Social Services.

The group comprises mainly of women – of the 17 members, only 3 are men. I enquired why the men were not keen in joining the group. I am informed that this is normal with men, that they are not fond of groups, that they don't like to stay where there is no money, that they expect to get benefits immediately they join the group. They are not patient to wait.

The group is confident that it can perform better than it is currently doing, if only it had capital resources. Although there are various credit facilities available and the members are aware of them, they are hesitant to endorse such a move. They fear they might not be able to pay. Members have witnessed neighbours being auctioned for non-payment of loans they took from financial institutions. They fear getting into circumstances that can lead them to such an experience.

All the cultivation that the group undertakes is rain-fed. In their first year of operating as a FFS, the group had a host farmer who offered 1 acre of land near a river valley. The group members dug a well for the purposes of watering their vegetables and fruits. But in the course of time, the host farmer developed cold feet, quit the group and denied the members access to the communally operated farm. The group members had invested in digging the well and applying manure to the jointly cultivated piece of land. The MoA had provided the group with a water pump to enable them irrigate tomatoes and green vegetables. Once the well and the farm were no longer accessible, they returned the pump to MoA. The member withdraw and returned the assets belonging to the group (he had goats for the group), except the well. There are rules governing termination of membership to the group, many of which are rather punitive. For instance a departing member is not entitled to a share of collective assets such as the cash in bank or goats bought by the group - he leaves with only the benefits he or she has had during her stay in the group. However, this rule applies only when it is the member who indicates intention to leave. If the group ejects him, then he is compensated. Disappointments by some members are not unique to this group, my informant tells me. Yambiu FFS which is just a few kilometres from Ithumbi is one other case. On the second year of good harvest on a communal piece of land, the host farmer chased the members away from accessing it. The land was virgin at the start of the group activities. The members had to break the hard ground, apply manure, terrace and plant trees, thus transforming the productivity potential of the piece. Indeed, stories of host farmers withdrawing after a season or two are common. They simply inform the members that they should look for land elsewhere.

Leadership of groups can also be problematic, the Ithumbi Chairlady laments. Members bring their own problems to the group and it is up to the leader to control the running of the group else members leave once they find that the group will not solve their problems. The group must have projects that can bring money, to sustain member interest. When the FFS meets, the secretary takes minutes. Decisions made are recorded. If there is manual work to be done, it is allocated to individuals and those who do not do their part are fined some money. The two most significant persons are the secretary and the treasurer, because they have to keep updating the group. The chairlady is the overseer.

The group also makes aloe vera soap. They were trained by an NGO called Kenfarm. They distribute the soap to members to sell around. The chairlady laments that the market is not very good – the members have to walk around the village, in offices in Mwingi, in the market to try to sell the soap. The chairlady is a host farmer – she has offered 1 acre for the group where they are testing growing different crops. Currently they are experimenting with Gadam sorghum, at the request of the MoA.

Every end of year, we celebrate. We take one of our goats, slaughter and eat together.

[91] Plastic seats are popular with village functions such as meetings, training, weddings, funerals etc as they can be moved with easy and take little storage space.