

**Challenges to and Opportunities for Collective Action in
Managing Communal Natural Resources: a case of Shompole
Wetland, Kajiado District, Kenya**

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N50/10238/2006

**A Thesis Submitted in Partial Fulfilment for the Degree of Master of Environmental
Studies (Community Development) in the School of Environmental Studies of
Kenyatta University**

October 2010

Declaration

This thesis is my original work and it has not been presented for award of a degree or any other academic qualification in a learning institution.

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Dedication

To the posterity of communal natural resource systems and collective action

Acknowledgement

I'm deeply grateful to various institutions and individuals that made this research a success. My sincere gratitude is expressed to Horn of Africa Environmental Research Centre (HoAREC) for giving a grant that was administered by African Conservation Centre (ACC), which facilitated field work. Further in recognising the unquantifiable contribution of ACC to this study, I am grateful to the wise counsel received from ACC director Mrs Betty Buyu on how to enrich the study and make it demand-driven in meeting the needs of the community. Many other members of ACC staff contributed immensely to this study, including the deputy director Mr James Ndungu who pioneered his research in Shompole on economic valuation of the wetland. Further, am grateful to Andrew Muchiru, Victor Moses, Julius Muriuki, and Miriam Kaloki and for their contribution in statistical data analysis.

Am grateful to my supervisors Dr Nelson Mango and Dr. Deborah Nightingale, under whose guidance I was able to conceptualize this research and report the findings of the study as is. Am also indebted to my key informants who included Dr David Western and Dr Shirley Strum; through constant consultations on the nature and design of community resources management studies, I was able to put thoughts together during data analysis. Mr. Joseph Munge who is also an employee of ACC at the Shompole field level and the area councillor Mr Denis Kuya played a critical role in actualising the research, including logistical planning, community mobilization, and introducing me and the study to the community. Research assistants who participated in writing proceedings of Focused Group Discussions and in administering questionnaire surveys are owed greatly to the success of this study. Last but not least am grateful to the respondents who took part in either focused group discussions or questionnaire surveys.

I owe a lot of gratitude to my family for their contribution towards the success of my education.

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Abbreviations and Acronyms

ACC– African Conservation Centre

CPR- Common Pool Resources

CBO- Community Based Organizations

CRS- Creative Research Systems

DDP- District Development Plan

FGD- Focused Group Discussions

HoAREC- Horn of Africa Environmental Research Centre

IKS- Indigenous Knowledge Systems

IMF- International Monetary Fund

GPS- Geographical Positioning System

PRA- Participatory Rural Appraisals

SAPs- Structural Adjustment Programmes

SORALO-South Rift Association of Land Owners

Abstract

This research set out to investigate challenges and opportunities to collective action in managing communal natural resources derived from Shompole wetland in Magadi division, Kajiado district. Magadi division is classified as a semi-arid area with annual average rainfall being less than 500mm. Hence the wetland is a critical dry grazing resource to the pastoralists in the area whose livelihood depends, fundamentally, on livestock. The swamp has traditionally provided a seasonal grazing area for Shompole group ranch when other pasture areas are in seasonal decline. Further, the swamp is a wildlife haven for grazing and watering during the dry season. However, as the population increases, coupled with changes and diversification of income in the area and changes in the whole Ewaso Ngiro ecosystem, and continuous breakdown of community institutions, the swamp is now used non-discriminately all year round. This is because the swamp is available to everyone in common; each person has the incentive to use as much of the swamp as they want, even though the collective result has been the destruction of the swamp, making it increasingly unable to sustain the large number of livestock taken there during the dry season. The problem is further compounded by abstraction of water up-stream Ewaso Ngiro River for irrigation and the lack of agreeable community management structures that can advance controlling the misuse of the swamp. This research therefore set out to identify resources the community and its environs draw from the swamp; investigated community rights to the use of Shompole swamp, social relations of resource users, resource extraction values and norms, procedures for monitoring and countering opportunism through social sanctions and conflict management; and challenges and opportunities for sustainable use of the swamp. The study employed both primary and secondary data. The latter was collected from different sources such as books, journals, and seminar presentations while the former was achieved through key informants' interviews, Participatory Rural Appraisals (PRA) methods using focussed group discussions, and questionnaire surveys. These methods generated both qualitative and quantitative data that was analysed using statistical packages such as chi-square tests, correlation, frequency analysis, and exploratory data analysis including histogram and radar/rose plots. Key findings on the challenges to resource management in the study area include: cultural conservatism against modernity exemplified by traditional animal husbandry practices that are in conflict with modern modes of production, usurpation of emerging and alternative economic activities by outsiders, conflict of private against public resource tenure systems, and low levels of education, among others. Opportunities for improved livelihoods and resource management in the study area include: a vibrant market economy supported by tourism within reach, availability of abundant natural resources for exploitation, for example, wildlife, minerals, water resources, and agricultural potential in the study area. The study recommended a monitoring strategy to map grazing system and movement of livestock in the swamp, wetlands policy that focuses on co-management to enhance output and sustainability and collaborative initiative to support traditional grazing patterns since the group ranch concept has not been very successful.

CHAPTER 1

1 Introduction

1.1 Background to the study

Examples abound worldwide, of collective action problems which arise in connection with the use of resources to which there is open access (Tyler 2006). Hardly a week goes by without a major news story in the world about the threatened destruction of a valuable natural resource (Ostrom, 1990). Most of the threatened resources are under communal use. In their analysis of problems involved in water resource management in developing countries, Carruthers and Stoner (1981) argued that without public control, overgrazing and soil erosion of communal pastures would inevitably result. However, it's also recognised that in areas of long-standing human occupation, cultures that depend on valuable Common Pool Resources (CPRs) well understand that the security of their resource base requires regulation. From the Arctic to the tropics, many cultures have developed complex local systems for allocating access to resources, sharing benefits, and limiting resource extraction. These systems were not based on modern scientific study; but they certainly reflected extensive local knowledge and experience (Berkes 1989; Ostrom 1990). In the Arsaal Valley of Lebanon, for example, traditional social relations governed herders' access to seasonal pastures of varying quality and collective decisions allowed for flexible management according to pasture conditions (Tyler 2006)

Similarly, in rural Eastern Africa the vast majority of people continue to relate to each other and with their natural resource base on the basis of customary laws and norms applied by traditional institutions. However, the statute books provide a different basis for such rights founded on the regime of property laws imposed by the colonial system (Ghai, 1979). This legal environment creates an abiding conflict situation that is both institutional and systemic. The customary legal arrangement has its own institutional resource management framework that allocates resources, settles disputes when they occur, exacts penalties, inflicts punishment on offenders and otherwise governs the resource use. It is a framework that is not necessarily within the formal statutory system, and which, in certain instances, is informed by ideals that are contradictory to ideals that

are the basis of the formal administrative system. The traditional framework derives its legitimacy not from the policy and legislative actions of the governments, but from the customary norms of traditional society. The sanctions applied within this framework are equally legitimated not by the formal structures of government but by the same customary norms and beliefs (Okoth-Ogendo, 1991).

It should also be noted, however, that as society evolves, the nature and intensity of natural resource use conflicts also changes. This means that in societies that are rapidly changing, as in Kenya, it is not possible to create a conclusive list of natural resource management conflict situations. The traditional mechanisms for containing resource conflicts are collapsing as are the external conflict management mechanisms that were in place; some of the socio-cultural changes that are taking place in the traditional African society are inevitable (Okoth-Ogendo, 1991). Urbanisation has also brought radical changes within African traditional society that have implications for natural resource management and has affected the capacity of traditional systems and institutions to cope with the conflicts (Ghai, 1979).

In researching on water-shed level natural resource management problems in highland areas of Eastern Africa countries especially Ethiopia, Kenya and Tanzania, communities identified five different types of problems which are: “problems associated with the management of common property resources (grazing lands, water, forest); problems of natural resource access and distribution; trans-boundary problems between neighbouring farms or landscape units; declining productivity due to the absence of collective action institutions; and livelihood problems that are best addressed through collective than individual actions” (German, et al., 2005). It is also recognised that natural resource management has gender dimensions: “women often have limited influence on decision-making at community level or the household yet they are on the frontlines in coping with resource degradation and changing production systems” (Vernooy 2006).

The study area shares aspects of CPRs discussed above. Shompole swamp is located in Shompole Group Ranch, Magadi division, Kajiado district. The swamp is in the flood plain of the Ewaso Ngiro River where it enters into Lake Natron in Tanzania. Lake

Natron is the main breeding site for both the lesser and greater flamingos which are the major tourist attraction especially in Lakes Nakuru and Bogoria. The study area which is inhabited by Maasai pastoralists is classified as semi-arid, with annual average rainfall being less than 500mm. The existence of Shompole swamp in an arid zone guarantees an oasis for livestock grazing and watering during the dry season, supporting the socio-economic base for pastoral Maasai community in the area (Warinda, 2000). The swamp is also rich in biodiversity and constitutes an important wildlife refuge; as a result tourism development in the area is picking up and already two lodges with a 50 bed capacity have been developed in the last four years. The swamp has traditionally provided a seasonal grazing area for Shompole group ranch when other pasture areas are in seasonal decline or completely decimated. However, at the time I was carrying out field work in January 2009, the community exhausted grass at the swamp early, just as the drought sets in. As a result, the community was forced to seek grazing refuge in Nguruman escarpments to sustain their livestock to the end of the drought. This is a result of increase in population, diversification of income and the breakdown of community institutions (Ndungu 2006).

The study has taken stock of the challenges to the sustainable use of Shompole swamp. It explores the opportunities that can safeguard this pastoral resource. In order to do this, the research has identified the ecosystem services provided by the wetland to the community and its environs and the way they have been changing; investigated community rights to the use of Shompole swamp, the social relations of resource users, values and norms that define and control resource extraction, traditional procedures for monitoring and countering opportunism through social sanctions and conflict management; and challenges and opportunities collective action faces in the sustainable use of the swamp.

1.2 Statement of the problem and justification for the study

Shompole swamp, as is the case with many other resources used in common faces challenges in ensuring its sustainable utilization. Olson (1965) says that “when a number of individuals have a common or collective interest - when they share a single purpose or objective - individual, unorganized action, either will not be able to advance that common interest at all, or will not be able to advance that interest adequately”. Since the swamp is commonly available to members of the group ranch, everyone in the community has the incentive to use as much of the swamp, even though the collective result has been the decimation of the grass at the on-set of dry season, making it increasingly unable to sustain the large number of livestock taken there during the dry season. The problem is further compounded by the lack of agreeable community management structures that can prevent the misuse of the swamp.

Further, traditional institutions are declining, and so with them collective action that was once bestowed with obligations to regulate community rights to the use of the swamp, social relations of resource users, and traditional values and norms for resource extraction. Procedures for monitoring and countering opportunism through social sanctions and conflict management were also a function of collective action. The institutions have been weakened due to various factors, including the formal system of governance (provincial administration) that do not recognise them and also the legal framework, Group (representative) Act, that establishes group ranches vests authority in the management committee of the group ranch and cultural institutions have no role to play.

The increase in population and urbanization has also made it difficult to engage in collective action. Urbanization has resulted in the migration of large numbers of people – the young moving to urban centers for formal employment. Modernity coupled with urbanization has brought about changes in traditional structures for resource regulation and also conflict resolution. With this, it is evident that boma sizes have reduced dramatically with more becoming single family bomas. It was also evident that community members who have had formal education and were working away tended to

shun the traditional way of communal living. In extension, this means that acquisition of wealth and diversification of livelihoods through employment and trading is leading the community into individualization. Once they move in to towns they come under the influence of diverse cultures (Okoth-Ogendo, 1991). Thus, modernity and urbanization exposes the migrants to different cultures and individualism. They begin to question some of the tenets of traditional society including those that govern property relations, thereby creating new situations of conflict.

The group ranch concept has also been a source of conflicts, especially since it has changed the traditional ways of resource utilization and conflict resolution. The concept introduced a new level of territorial and administrative organization and a new method of decision making, aimed at radically changing Maasai production and resource management. The system introduced in the colonial has emphasized the use of group ranch committees and provincial administration in conflict resolution and control of grazing resources. In practice, however, they have incapacitated traditional leadership in the study area, without providing a workable substitute.

The increase in population and subsequent increase in livestock numbers has put unsustainable pressure on the wetland, and fostered cases of opportunism. Grazing cycles traditionally used in exploiting the swamp and pasture around it have been disregarded due to pressure exerted by the increased number of animals. Grazing cycles that used to be undertaken for a few months in a year has changed to presently virtually the whole year is spent in grazing livestock in the swamp. Due to frequent droughts, the community has resorted to burning dry vegetation so that it can re-generate to feed on their livestock; this is affecting wildlife and the general ecology of the swamp.

Increased farming in the Nguruman escarpment has also had adverse effects on the general availability of pasture. The escarpment which has traditionally provided the grazing grounds during dry seasons. This has exacerbated the conflicts since it has reduced the available resources.

1.3 Research Questions

- i. What services do the community and its environs derive from the wetland?
- ii. What are the community rights and regulatory procedures governing collective action on access and use of the wetland?
- iii. What are the challenges that hinder the sustainable use of the wetland?
- iv. What are the opportunities available that can help in the sustainable use of the wetland?

1.4 Objectives

- i. Identify resources of the wetland to the community and its environs and the changes that have occurred in their use
- ii. Investigate community rights, regulatory procedures, values and norms pertinent to collective action in the use of wetland resources
- iii. Investigate challenges that hinder sustainable use of the wetland
- iv. Identify opportunities for sustainable use of the wetland

1.5 Significance of the Study

This study is inspired by the need to develop sustainable institutions formed and run by the community to take charge of the management of the wetland to ensure sustainable benefits are attained. Shompole swamp is central to sustainability of pastoralism in the study area because it is central to established livestock grazing patterns.

1.6 Conceptual Framework

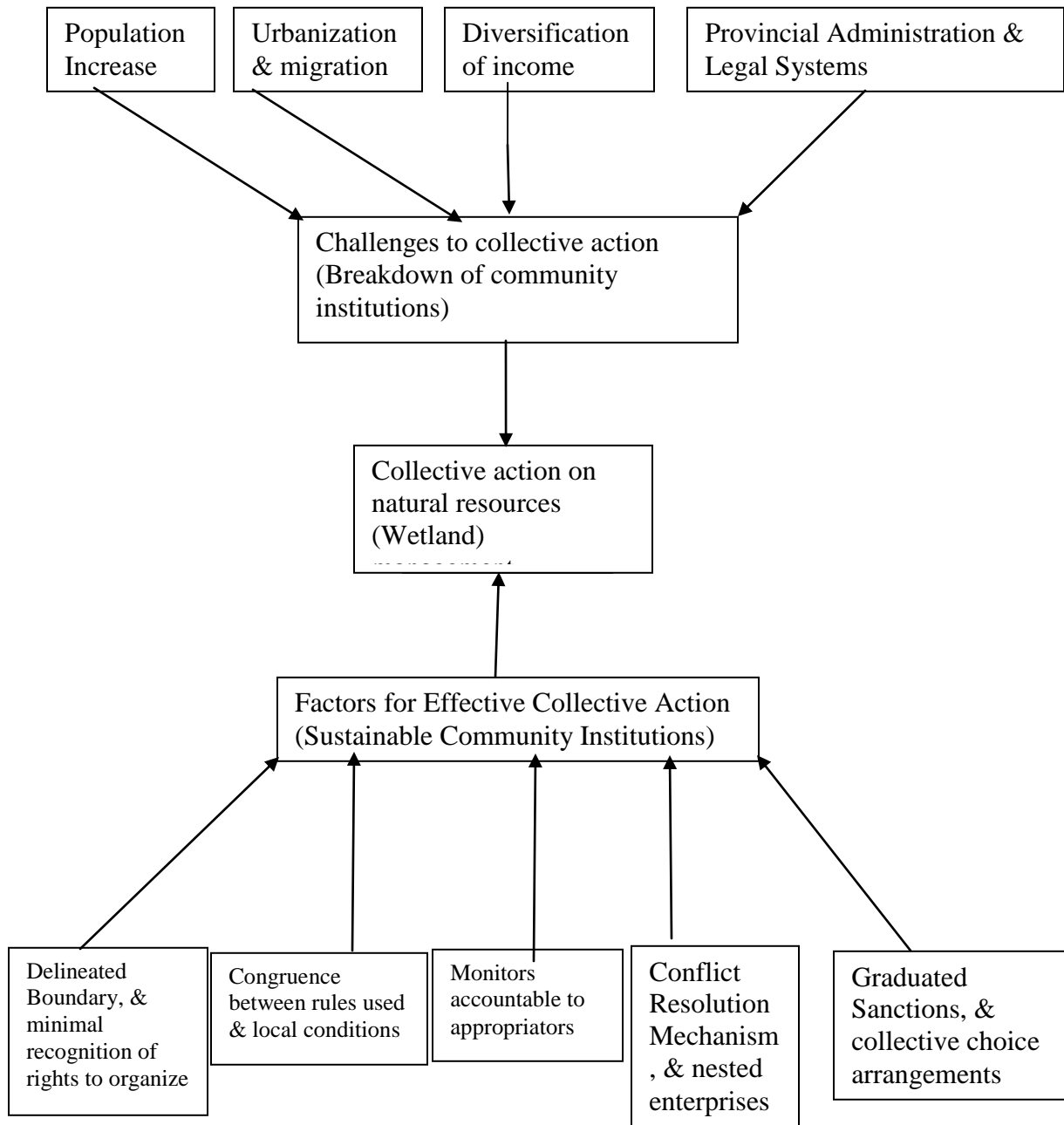


Figure 1 Conceptual framework of factors influencing communal use of natural resources

Source: Kuloba, J. 2010, this study

1.7 Operational Definition of Terms

‘Boma’: a cluster of homesteads, enclosed in one compound.

Co-management: ‘A collaborative arrangement in which the community of local resource users, local and senior governments, other stakeholders, and external actors share responsibility and authority for management of the natural resource in question’ (Tyler, 2006).

Adaptive co-management: A system of management in which multiple parties are involved in different ways in a process of iterative problem solving. Learning from shared experience and analysis informs subsequent action, information gathering, and management decisions (Berkes, 1989).

Collective Action: direct actions carried out by groups of people working towards common goals; the direct common actions must be voluntary (German et al 2005).

Common Pool Resource (CPR): this is a resource that is controlled by an identifiable community of users, and regulations are made and enforced locally (Ostrom, 1992)

Community Institutions: are the set of rules actually used (the working rules or rules-in-use) by a set of individuals to organize repetitive activities that produce outcomes affecting those individuals and potentially affecting others (Ostrom, 1992).

Institutions: are as “humanly devised constraints that structure human interaction. They are made up of formal constraints (rules, laws, constitutions), informal constraints (norms of behaviour, conventions, and self-imposed codes of conduct), and their enforcement characteristics” (North, 1993)

Governance: body of rules, enforcement mechanisms and corresponding interactive processes that coordinate the activities of the involved persons with regard to a concerted outcome (Ostrom, 1990)

Grazing Demand Management (GDM): The development and implementation of strategies aimed at influencing demand, so as to achieve efficient and sustainable use of a scarce resource (Halderman, 1972)

Property: the rights and obligations of individuals or groups to use the resource base; a bundle of entitlements defining owner's rights, duties, and responsibilities for the use of the resource (Olsen, 1971)

Property rights: can be defined as “the capacity to call upon the collective to stand behind one's claim to a benefit stream” (Bromley, 1991)

Resource tenure: is a claim that one person or group makes on a resource, and that other people or groups recognize as legitimate and enforceable (Bromley, 1991)

Social Capital: ‘the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups of individuals bring to a recurrent activity’ (Ostrom, 1994)

Politics: is the locus, structure and function of power in a society (Okidi, 1994)

Pastoralism: Pastoralism is a pattern in which people make their living by tending herds of large animals, occupying arid and semi-arid regions (Halderman, 1972).

Nomadic Pastoralism: Pastoral nomads follow a seasonal migratory pattern that can vary from year to year, with timing and destinations of migrations being determined primarily by the needs of the herd animals for water and fodder; pastoral nomads do not create permanent settlements, but rather they live in relatively easily constructed dwellings the year round (Hedlund, 1971).

Sedentary Pastoralism: is a livestock keeping method in which practitioners follow a cyclical seasonal pattern of migrations between the same two locations in which they have regular encampments or stable villages often with permanent houses (Halderman, 1972).

Group Ranch: is a form of land tenure under which a tribe, clan, section, family or other group of persons, whose land under recognized customary law belongs communally to the persons who are members of the group with freehold title deed held by the group (Grandin et al., 1987).

Wetland: An area of land whose soil is saturated with moisture either permanently or seasonally. Such areas may also be covered partially or completely.

Swamp: A wetland with some flooding of large areas of land by shallow bodies of water

Challenges: obstacles or constraints to the attainment of community livelihood objectives

Opportunities: situations or means of attaining community livelihoods, wellbeing and empowerment.

1.8 Organization of the Thesis Report

This thesis report has five chapters including an introduction. Chapter two is the literature review, under which several issues concerning management of communal natural resources. These issues include paradigms on and challenges to collective action, ecosystem services derived from wetlands, and pastoralism as a way of life of the study community. The third chapter details methods used to collect both primary and secondary data, and description of how the data were analysed. Among the methods used in the collection of primary data described in this chapter include focused group discussion, key informant interviews, and questionnaire surveys. The fourth chapter presents findings of the research, thematically arranged from social-spatial analysis of the study population; historical changes over uses of the changes; dynamics in the

management of the swamp; co-management as an opportunity for collective action; ecosystem services derived from the wetland; and applicability of Common Property Rights (CPR) design principles in the management of Shompole swamp. Chapter five contains conclusions and recommendations arising from the results and discussions.

CHAPTER 2

2 Literature Review

2.1 Introduction

This chapter of the thesis report highlights research that has been carried out regarding challenges to and opportunities for communal use of natural resources. The chapter has explored several issues including paradigms on communal resource management, approaches and challenges to communal resource use, co-management as an opportunity for communal resource use; and ecosystem services derived from wetland resources. This section has also explored literature on the study population especially as it regards pastoralism and the effect of the group ranch system on pastoralism.

2.2 Paradigms on Common Pool Resource and Collective Action Institutions

2.2.1 Collective Action

Niamir-Fuller (2002) defines collective action as “an action taken by a group (either directly or on its behalf through an organization) in pursuit of members’ perceived shared interests”. Meinzen-Dick, *et al.*, (2004) also defines collective action as actions aimed at achieving a common objective, when the outcomes depend on interdependence of members. What most definitions have in common is that “collective action requires the involvement of a group of people, it requires a shared interest within the group and it involves some kind of common action which works in pursuit of that shared interest. Although not often mentioned, this action should be voluntary; to distinguish collective action from hired or forced labours” (Meinzen-Dick, *et al.*, 2004). Examples of collective actions include collective decision-making, setting rules of conduct of a group and designing management rules, implementing decisions, and monitoring adherence to rules. Members can contribute either monetarily or in-kind to achieve the shared goal. The action can take place directly by members of a group, or by an agent on their behalf. The coordination can take place either through a formal or informal organization, or by spontaneous action. Thus, an organization may contribute to collective action, but the two concepts are not the same. In the context of natural resource management, collective

action of deciding on and observing rules for use or non-use of a resource can take place through common property regimes or coordinating activities across individual holdings (Meinzen-Dick, et al., 2004).

Collective action is easiest to identify when there is a clearly defined group that takes part. Moreover, “clearly defined boundaries” is the first of Ostrom’s (1992) “design principles for long-enduring, self-organized irrigation systems,” which have also been applied to many other cases of natural resource management. This indicates that bounding of the group, which allows people to know who else is (or should be), contributing, fosters collective action. At the same time, in many instances of collective action, it is not clear how the group is defined nor are the boundaries necessarily fixed or rigid. Some people may participate one time, others another, with none of them knowing exactly who is involved, but all identifying with the collective action. For example, neighbourhood clean-up activities may be done periodically without clearly defining who is in the ‘neighbourhood’. Thus, “there is a gray area between organized and bounded collective action and action within more amorphous social networks” (Meinzen-Dick, et al., 2004).

Formal or informal organizations may be helpful in coordinating and enforcing collective action, but it is important to differentiate organizations from collective action. On one hand, there are situations where many organizations exist merely on paper, and do not lead to any action; while on the other hand, collective action may occur spontaneously. Moreover “collective action can manifest itself and can be understood as an event (one time occurrence), as an institution (rule of the game applied over and over again), or as a process” (Sultana and Thompson, 2003). While many previous studies analyze the institution of collective action, others focus on the process of collective action.

2.2.2. Social capital

The concept of social capital has received considerable attention in a variety of development contexts in recent years (Gupta, 1985a). As with collective action, there are many interpretations of social capital, but one useful definition is: "the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups

of individuals bring to a recurrent activity (Ostrom, 1999). These include both horizontal ties among a group (sometimes referred to as bonding social capital) as well as vertical ties between different groups (referred to as bridging social capital). As observed by Woollock and Narayan (2000), “relations of trust, reciprocity and exchanges, common rules, norms and sanctions, and connectedness, networks and groups are often indicated as important mechanisms to build social capital assets”.

Further, Woollock and Narayan (2000) acknowledges that while the study of such social ties itself is not new, the application of the term ‘social capital’ has given it greater prominence in both academic research and development practice. “Social ties are now viewed as important assets, a form of capital on a par with natural, physical, financial, and human capital. Similar to collective action, social capital has been defined differently following diverse approaches” (Ibid). Coleman (1988) stresses the individual asset component, but while the first definition is situational and instrumental, the second is based on the motive as the foundation of what social capital is. On the other hand, other political science approaches tend to regard social capital as a collective good (Putnam 1993, Ostrom 1994). “Alternative approaches look at social capital in terms of social, psychological and cultural beliefs” (Woollock and Narayan, 2000). Another distinction is made between structural and cognitive social capital (Uphoff, 2002), “where the first refers to social organization characteristics including rules, procedures and networks, while the second is linked to the mental process also reinforced by culture, ideology and beliefs”.

Tang (1992) observes that the biggest contribution of literature on social capital is the recognition of the importance of social relations for people’s sources of income and wider and economic growth. The concept has also brought closer together diverse social science disciplines such as sociology, political science and economics in the study of development like never before. The major weakness or controversial aspect, as recognised by Uphoff (2000) has been the operationalization of the concept. This is linked to the fact that social capital, like collective action, cannot be measured directly. It is deemed that if social capital constitutes a stock variable that refers to the structure of social relationships, collective action can be understood as one of the flows associated

with it (Uphoff, 2000). Studies show that social capital facilitates collective action (Ostrom, 1994; Woolcock and Narayan, 2000), so that empirical research must usually incorporate both concepts when analyzing collective action.

2.2.3 Collective Action Institutions and Common Pool Resources

The role of collective action in natural resource management is gaining attention worldwide (German, et al., 2005), and he observes that “there is increasing awareness that lack of collective action is often the primary issue when natural resources are managed in an unsustainable way.” This work illuminates the situation of Shompole wetland. Nevertheless, it is also recognized that resource users have organized themselves to manage common resources such as grazing grounds and fisheries, and have developed and maintained institutions to govern these resources (Ostrom et al., 2003). Findings from a large number of cases covering a diversity of resource types, geographical areas, and cultures have revealed the existence of local and traditional management systems and of commons institutions (Berkes, 1989; Bromley, 1992). “These institutions — that is, local norms and rules — have been found to exist even in the absence of any government regulations, but then they are the government regulations” (Ostrom et al., 1990).

Institutions are defined by North (1993) as “humanly devised constraints that structure human interaction. They are made up of formal constraints (rules, laws, constitutions), informal constraints (norms of behaviour, conventions, and self-imposed codes of conduct), and their enforcement characteristics”. It is also important to note that institutions are socially constructed; they have normative and cognitive as well as regulative dimensions (Jentoft et al., 1998).

It has been established that collective resource management systems develops when a group of individuals are highly dependent on a resource and when the resource is limiting (Ostrom, 1990; Bromley, 1992). “Repeated experiences with a resource problem, such as low catch or no catch, are often necessary for a response” observe Ostrom et al., (1999). In the case of Shompole wetland, decimation of grass before the drought ends has been a

problem. Hence, the principal problem faced by members of a group using a commons is how to organize themselves and to change from a situation of individual action to one of collective action. A collective action strategy is one that helps obtain greater joint benefits (e.g. making a livelihood) and reduces joint costs (i.e. resource depletion). “Collective action occurs only if the groups of commons users have the authority to make decisions and to establish rules over the use of the resource” Ostrom (1990).

More often, individuals have incentives to adopt opportunistic behaviors to enhance private gain by circumventing rules, at the expense of collective good. These individuals are called ‘Free riders-’ “those who benefit from the work of the group without contributing to that work” (Ostrom, 1990). The challenge for any common property regime is to establish institutional arrangements that minimize transaction costs and counteract opportunistic behaviour such as free riding; transaction costs are the costs of doing business (Bromley, 1992). If the rules are clear and if everyone knows them, transaction costs will be low and rules relatively easy to monitor and to enforce (Feeny, et al., 1990)

Ostrom (1990) observes that “collective action entails coordination and organizational problems that do not exist with other regimes, namely state property and private property.” To maintain institutional arrangements over time, further observes that it is important to develop workable procedures for monitoring the behavior of the resource users and to use social sanctions (or penalties) where necessary, and for settling conflicts. Again, transaction costs come into play for sanctions and for conflict management. Where a group of users know one another, have reciprocity, similar livelihood activities, and share similar values, it will be relatively easy to enforce sanctions and to manage conflicts (Ibid).

2.2.4. Communities and Rules for Common Pool Resource Use

The literature contains many examples of successful community-based management systems but also documents two general kinds of failure. The first is “community failure” or the inability of the group to regulate its own affairs (McKean, 1997). The second is

related to the impact of external forces on local institutions, including technology change, economic change and population pressure (Berkes, 1985). Furthermore, Olson (1971) argues that individuals in any group attempting collective action will have incentives to "free ride" on the efforts of others if the group is working to provide public goods. Individuals will not "free ride" in groups which provide benefits only to active participants.

"Public goods are goods which are non-excludable (i.e. one person cannot reasonably prevent another from consuming the good) and non-rival (one person's consumption of the good does not affect another's, nor vice-versa). Hence, without selective incentives to motivate participation, collective action is unlikely to occur even when large groups of people with common interests exist" (Ibid).

The challenge is to reconcile local-level rules and government regulation toward improving resource management. In traditional societies, resource use rules were made and enforced locally. In modern societies, such rules are usually made by central governments. The ultimate responsibility for the resource rests with the government. But it may be more efficient and effective for government resource managers to share management powers and responsibility with fishing communities, and to have some of the rules made and enforced locally (Pomeroy and Rivera-Guieb, 2006).

2.3 Approaches and Challenges to Collective Action in Common Pool Resource Use

2.3.1. Conflicts as a Challenge and Opportunity to Collective Action

Conflicts have been acknowledged as "an integral part of the process of human interaction; they are a continual fact of life in a society" (Pendzich et al., 1994). With respect to natural resources, conflict is bound to arise from competing demands placed on resources by different claimants within the society. Even within a cohesive community of people, conflict may arise over resources as population increases causing demand to exceed supply (Pendzich et al., 1994). This means that in societies that are rapidly changing, as in Eastern Africa, it is not possible to create a conclusive list of resource

conflict situations; they are the symptoms of disruption or transition within the society. “Transition may be positive when it expresses the need for change and/or the ability of institutions to adapt to social, economic and/or environmental conditions. From this standpoint, conflicts contribute to the preservation of social balance by capturing certain challenges, changes and developments within a given society or in terms of governance. Transition may, however, be negative (Crowfoot and Wondolleck, 1990).

In many cases, conflicts are a reflection of imbalances in power structure within communities and attempts by the weak/marginalized at changing or challenging the established order. Regarding collective action, conflicts associated with natural resources stem from priorities of the parties involved regarding who should benefit from the resources. Resource use conflicts also encompass indicators of resources availability, evolution of tenure rights and systems, and accessibility and control over resources. Crowfoot and Wondolleck (1990) indicates that settling ensuing social strife is critical if the parties are to adopt the necessary changes and adjustments with respect to resources and the environment; a clash of interests makes it unquestionably more difficult to utilize and manage resources.

2.3.2. Political Development as a Challenge and Opportunity to Collective Action

Okidi (1994) established that politics determines the locus, structure and function of power in a society, each with serious implications for access and use of natural resources within the society. In Eastern Africa, politics plays a very significant role in the allocation of natural resources and is therefore a major cause of natural resource conflicts. Save for Ethiopia, all East African Countries were colonized; the colonial administrations trampled upon native structures and systems of governance, uprooted and resettled whole populations from their natural habitats and interfered with the organization of native society (Ghai, 1970). They justified their actions with the pretext that they were bringing the benefits of modern government, economics, and culture to Africa (Ibid). However, they were also quite clear that they were grabbing land, resources and trade routes.

Okoth-Ogendo (1991) expresses that the degree to which the colonial powers interfered with traditional structures of organization and governance depended, to a large extent, on the degree of organization that existed in the colony at the commencement of the colonial experience. This is justifiable because the impact of the colonial experience differs from one country to the next, even where the colonial power was the same (Ibid). The primary objective of colonialism was the exploitation of natural resources for the benefit of the colonial powers; the political structures established by the colonialists were meant to ensure the disempowerment of native peoples. They were also to keep other colonial powers away and to ensure money went back to Europe. This paved the way for the colonialists to acquire unhindered access to the natural resources of the colonies (Ibid). It is important to note, in this connection, that native peoples' quest for access to natural resources and repossession of their land triggered the process of decolonization (Okoth-Ogendo, 1991). In all the three former colonies, Kenya, Uganda and Tanganyika, the marginalization of the people from their main resources was a major catalyst for the agitation for political independence. The desire to reclaim the control of land from the colonialists was the basis for the struggle for political liberation (Okidi 1994).

When Kenya, Tanzania and Uganda attained political independence in the early 1960s, they inherited political structures with specific resource management orientations that were geared off traditional systems (Okidi, 1994). Of the three countries, Kenya had experienced the most far-reaching settlement during the colonial era. An elaborate land titling programme had been set in place in the 1950s and through it, customary land tenure systems were converted to private titles in large parts of the country, pushing locals out of their inherited. The property regime under the titling scheme exacerbated existing conflict situations (Ghai et al., 1970).

The distribution of power between the central governments and the local level traditional institutions exhibits the political dimension of natural resource conflicts in Eastern Africa; political power is concentrated at the centre, denying entitlement of grassroots level in decision-making; even where there have been attempts at decentralization, there limited expansion of social liberties (Okoth-Ogendo, 1991). As a result, these efforts amount to mere decentralization of executive authority; hence, powers and government

agencies external to local communities exercise resource management decision-making without regard to local interests and priorities. The regrettable result of this centralization of political authority, witnessed all over Eastern Africa, is the marginalization of pastoral communities, from the Karamoja in Uganda to the Maasai in Tanzania and Kenya. These pastoral communities, in whose section (Magadi) this research is carried out, have not always been key players in the political process; this is partly due to the expansive land they occupy and their limited populations.

It is noted however that recent political changes resulting from the democratization process that has swept across the region and the continent, have brought new opportunities for the empowerment of civil society. Community-based associations are being reactivated all over the region, with a commitment to empowering the local communities to participate effectively in the decision-making process relative to their traditional governance systems. Though they are not strictly speaking resource management associations, these community-based civil organizations are bound to get involved in resource management issues at the local level (Okoth-Ogendo, 1991; Juma et al., 1995). This may also have impact on the structure and decision making processes of community institutions in the study area.

2.3.3. Historical Context of Legal Implications on Collective Action

Conflicts in East Africa on natural resource use abound as a result of mixed operation of two different legal systems, one based on Western European perceptions of property and the other based on traditional African institutions, inherent in the study area. Throughout the colonial period in Eastern Africa, colonial law played an important function in the legitimization of policy imperatives; this was particularly so with respect to land acquisition (Ghai et al., 1970). The British were particularly adept at this, and in Kenya under British rule, a whole series of land laws were passed to justify the expropriation of the best parcels of land from the natives. The wholesale forcible removal of entire populations from their native lands and the granting of these fertile lands to the colonists were carried out without any form of compensation (Ibid). In some cases however, they were given other areas- that were already theirs. The colonial system created a legislative framework founded on the presumption that the law of the colonial power was superior to

the native customs and traditions that governed access and allocation of property and property rights. This created an enduring conflict in natural resource management in Eastern Africa (Juma et al., 1994).

The colonial powers sought, unsuccessfully, through policy and law, to extinguish all native forms of resource management institutions and systems. Even where the colonial administration did not interfere with traditional resource management systems, as in certain parts of Tanzania and Uganda, there were, nevertheless, a tacit policy commitment to changing traditional resource tenure to bring it closer to what the colonial administrators were comfortable with (Ghai, 1970).

While the legal systems, policy and institutions introduced during the colonial era have become formal structures governing resource management in most of Eastern Africa, their traditional counterparts continue to operate both formally and informally. In Kenya, Uganda, and Tanzania, recognition is given to customary law in the statute books, although in practice the governments and the courts have tended to ignore the customary laws; this is virtually inevitable given the limitations on the applicability of customary law. Where customary laws are applied, this is done as a temporary measure pending the adoption of statutory systems (Juma et al., 1995).

Furthermore, in most of rural Kenya, the vast majority of people continue to relate with each other and with their natural resource base on the basis of customary laws and norms. Access to natural resources in these rural areas is governed by customary rules applied by traditional institutions, even though the statute books provide a different basis for such rights founded on the regime of property laws that were imposed by the colonial system (Ghai et al., 1970, and Bradbury et al., 1995). This legal environment creates an abiding conflict situation that is both institutional and systemic. The customary legal arrangement has its own institutional resource management framework that allocates resources, settles disputes when they occur, exacts penalties and inflicts punishment on offenders, and otherwise governs the resource use. It is a framework that is not necessarily within the formal statutory system, and which, in certain instances, is informed by ideals that are contradictory to ideals that are the basis of the formal system. The traditional framework derives its legitimacy not from the policy and legislative actions of the governments, but

from the customary norms of traditional society (Migot-Adholla et al., 1981). The sanctions applied within this framework are equally legitimated not by the formal structures of government but by the same customary norms and beliefs. Given the political systems discussed above, these legitimization processes that exist outside the formal policy and legal framework are bound to be a source of serious conflicts (Ghai, 1970).

The most serious conflict situation borne out of the legal problems discussed here relate to the issue of tenure. Land and resource tenure systems espoused by the formal policy and legal framework, are ones founded on Western perceptions of property, in which ownership and control vests on an individual person or institution to the exclusion of all other claimants (Okoth-Ogendo, 1991). The hallmark of this tenure system is the individualized private title that bestows absolute ownership with the right to exclude others. The individualized tenure system came into existence in Western Europe at a certain stage in the evolution of feudalism to capitalist economic system. By the time colonialism commenced in Africa, the Europeans recognized this as the best form of tenure, arguing that it was conducive to the most productive exploitation of natural resources.

Traditional tenure systems on the other hand, vested the control of land upon the community rather than the individual. There was no concept of land ownership in the sense of excluding all other claimants. Rather, there were strict rules of access and use of land that ensured that all persons had access to land in accordance with their needs, whether for settlement, farming or pasture. Once a piece of land was allocated to the individual or family, and so long as the allocated remained in effective occupation and use of it, they retained the exclusive control and right to the land and its produce. However, the moment the land was vacated or left idle, control over it reverted to the community and it became part of what was available for allocation to other members of the community (Migot-Adholla et al., 1981).

To the colonial administrators who had been schooled in the primacy of private property, this communal tenure system did not make much sense; they considered it a free access system in which nobody was concerned to safeguard the resource, since nobody really

owned it. They argued that the system encouraged unsustainable exploitation of the resource as every person sought to maximize the benefits they derived from it. Thus throughout the colonial period, the colonists and the colonial administrations sought to replace the traditional tenure systems with the tenure system they were most familiar with.

In addition, suitability of communal resource tenure is not as yet universally accepted. Privatization of title continues to be the cornerstone of policy formulations by the governments of Eastern Africa, especially as part of the process of liberalization of the economies that was within the framework of the World Bank and International Monetary Fund (IMF) supervised Structural Adjustment Programmes (SAPs). “Little regard is given to the factors that informed the institution of communal tenure, especially in pastoral and other marginal areas” (Okoth-Ogendo, 1991).

2.3.4. Economic Factors as a Challenge to Natural Resource Use

With regard to economic factors as a challenge to natural resource use, the focus is on the diversity of demands that are made on natural resources by different sectors of society according to their major needs. Eastern African countries are endowed with a wealth of natural resources though there has been little industrial capability; natural resource base remains the most significant source of wealth for these countries and their peoples. These resources comprise the homes and the basis of livelihoods for the vast majority of the rural people in Eastern Africa, its capital upon which governments base their development processes, and also the private sector utilizes the same resource base for wealth creation (Okoth-Ogendo, 1991).

2.3.5. Socio-cultural Dimension a Challenge and Opportunity to Collective Action

“One of the greatest causes of natural resource conflicts in Eastern Africa is the impact of radical socio-cultural changes that the traditional society has undergone and continues to undergo” notes Jacobs (1965). The traditional processes for resolving resource conflicts are collapsing as are the external conflict management mechanisms that were in place. An

illustration is the loss of authority of elders, which is a direct consequence of the institution of state-controlled government mechanisms. The authority of elders was the basis of conflict management systems within traditional societies in Kenya. This authority is progressively being eroded as elders' councils and tribunals are replaced by government-appointed agencies and functionaries, especially the provincial administration. Yet these functionaries, who qualify for these appointments on the basis of considerations that are totally at variance with what constituted qualifications for leadership in traditional society, cannot effectively replace elders. Their authority does not derive from the traditional system, and they are lacking in the indigenous knowledge that made the elders so appropriate to the task (Ibid).

Rural to urban orientation has also brought radical changes within African traditional societies that have serious implications for natural resource conflict management and has affected the capacity of traditional systems and institutions to cope with the conflicts. Urbanization results in the migration of large numbers of people from the rural areas to the urban centers; most of these are young people in search of better opportunities, or out to up their skills in a competitive environment. Once they move in to towns they come under the influence of diverse cultures where traditional structures of authority no longer apply to them; even when they return to the country-side whether on visits or permanently, they do not ascribe to the authority of the elders. They doubt the efficacy and question appropriateness of some of the tenets of traditional society including, those that govern property relations, thereby creating conflict situations (Okoth-Ogendo, 1991).

All these socio-cultural factors that create conflict situations relative to resource management can be put together under the rubric of the impact of the development process on the culture and lifestyle of the African people.

2.3.6. Population Trends and effect on Communal Resource Use

Population pressure is a source of conflict in African communities that especially uses resources in common. Agricultural land has become insufficient resulting in large numbers of people moving from the agricultural areas into what were hitherto pastoral and forest lands (Okoth-Ogendo, 1991).

In 'Natural Connections; Perspectives in Community-Based Conservation', Western and Wright (1994) emphasize that the ultimate open-access resource problem is explosive growth in human population. The idea that population growth is an open-access resources problem is not new. Hardin (1968) developed his famous model of common pastureland as a means of illustrating the overpopulation that might be expected if society subsidizes the education and upbringing of children, so that there is incentive for each family to have more offspring than it can afford. Exponential growth in human population is hardly surprising. A fundamental tenet of ecology is the concept of carrying capacity, which is defined as the "maximum population that a given environment can sustain" (Daily 1992). Humans are different from other species in that continual advances in technology have enabled us to keep the system open and thus maintain higher and higher populations. But as Hardin (1968) points out, "these technological fixes merely ratchet population levels one notch higher without addressing the underlying social problems". There is need for the society to provide a system of incentives and constraints to ensure average number of children per woman.

2.4. Design Principles for Collective Action Institutions:

Researches on collective action indicate that some communities manage to cooperate while others fail naturally, raising the question of whether the difference is driven by community level institutions. Several extensive field analyses of common resource management have identified a common set of institutional features that promote long-lasting cooperation. Ostrom (1990) developed design principles (term "design principles" denotes a feature that contributes to maintaining the institutions and their resource base, and gaining user loyalty for the rules in use) that long enduring institutions for collective action should fulfil: clearly delineated boundaries; monitors who are either appropriators of the resource or accountable to appropriators; graduated sanctions; mechanisms controlled by appropriators used to mediate conflicts and when necessary, change rules; congruence between rules used and local conditions; minimal recognition of rights to organize; collective choice arrangements; and nested enterprises.

2.5. Co-management as an Opportunity for Collective Action

There have been changes in the understanding of equitable and sustainable natural resource management in the last two decades (Chambers, 1997). Environmental problems (drought, floods, erosion, deforestation, declining soil fertility, habitat loss, and over-exploitation) are happening at an alarming pace, driven by a range of factors including global climate. But practical actions to respond to these issues are not as prominent (Tyler, 2006). Too often, development professionals, whether local or expatriate, believe that only highly specialized experts can provide insights into complex local resource management problems; this has not worked. “These cases demonstrate practical alternatives whereby external technical expertise serves to validate local knowledge, inform local action, and facilitate locally led initiatives, that are ‘co-management’” Tyler (2006). This refers to “arrangements whereby local people and their organizations are given responsibility for decision-making about access to and use of natural resources, in exchange for assured benefits, through agreements with government authorities and other stakeholders” Tyler (2006).

The practice of co-management options for poor marginal areas is dependent on several interacting factors: the nature of the resource to be managed, local rights to the resource, the institutions governing those rights and decision-making, and how the resources are exploited (Ibid). The problems of resource management and access by the poor often centre on CPRs and on the associated system of resource rights or tenure. Under certain conditions, systems of collective rights will be defined by groups who can control access to CPRs to increase their benefits and reduce degradation of the resource (Schlager and Ostrom, 1992). In areas of long-standing human occupation, cultures that depend on valuable CPRs well understand that the security of their resource base requires regulation. From the Arctic to the tropics, many cultures have developed complex local systems for allocating access to resources, sharing benefits, and limiting resource extraction. These systems, even ones in western countries, were not based on modern scientific study; but they certainly reflected extensive local knowledge and experience (Berkes, 1989; Ostrom, 1990). In the Aarsaal Valley of Lebanon, for example, traditional social relations governed herders' access to seasonal pastures of varying quality.

Collective decisions allowed for flexible management according to pasture conditions (Tyler, 2006).

So the potential for resource management innovation rests partly on the rights of users, and partly on the characteristics of the ecosystem in question. Resource management is implemented through social institutions (Tyler, 2006). Co-management arrangements will vary with the nature of the resource, the political context, the expertise and skills of participating organizations, and the degree of mutual trust. Most analysts agree there is a broad spectrum of co-management arrangements. At one end, authority for NRM remains with the state, but local communities are consulted on specific issues. At the other end of the spectrum are arrangements that give communities or resource user groups' broad authority to take management decisions, but require them to report periodically to the responsible state agency (Tyler, 2006).

Tyler (2006) argues that this picture is complicated further because of “the range of management decisions that may be involved, from policymaking and planning, to setting rules, allocating harvests, investing in resource productivity, monitoring and enforcement, determining membership in user groups, and adjudicating conflicts”. Some of these management actions may involve multiple actors other than the local resource users and governments. These could be private corporations with a stake in resource development or conservation organizations or NGOs representing external interests in the protection of local resources (Ibid).

It is recognized that there are two broad conceptual approaches to co-management: one is premised on formal agreement between all the parties on detailed rights, responsibilities, and procedures in relation to the various resources in question. Negotiations focus on the details of power sharing and governance. This approach has been typical of the co-management agreements adopted in Canada, for example, between First Nations and provincial and federal governments (Goetze, 2004). Issues of jurisdiction and legal authority were more pressing than environmental degradation.

The second approach is to gear co-management arrangements to meeting urgent functional needs of the ecosystem and resource users. The starting point is consideration

of specific environmental and livelihood problems in need of resolution and of different stakeholders' interests. With this approach, various parties are brought together to design management strategies to address their problems. The details of power sharing and structure are an outcome of processes of action and learning, not the central focus of intervention. This approach is sometimes referred to as adaptive co-management (Berkes, 1989).

2.6. Ecosystem Services and Human Well-being in Use of Wetlands

2.6.1. Ecosystem Services and Human Well-being

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious, and the nonmaterial benefits. “Wetland ecosystems provide a diversity of services vital for human well-being and poverty alleviation” (WRI, 2005). It is well established that provisioning services from wetlands, such as food (notably fish) and fiber are essential for human well-being. Supporting and regulating services (such as nutrient cycling) are critical to sustaining vital ecosystem functions that deliver many benefits to people (Ibid). The delivery of fresh water is a particularly important service both directly and indirectly. In addition, wetlands have significant aesthetic, educational, cultural, and spiritual values and provide invaluable opportunities for recreation and tourism (WRI, 2005).

Wetlands are important tourism destinations because of their aesthetic value and the high diversity of the animal and plant life they contain (Ndungu, 2006). In some locations, tourism plays a major part in supporting rural economies, although there are often great disparities between access to and involvement in such activities. The demand from tourists for biologically rich sites to visit increases the value of intrinsically linked habitats, such as mangroves and sea grass beds. Temperate bays, semi-enclosed seas, and estuaries can generate tourism revenues of similar orders of magnitude. It is also noted that the negative effects of recreation and tourism are particularly noticeable when they

introduce inequities and do not support and develop local economies, and especially where the resources that support the recreation and tourism are degraded (Ndungu, 2006).

2.6.2. Ecosystem Services of Shompole Wetland:

The existence of a Shompole swamp in an arid zone guarantees an oasis for livestock grazing and watering during the dry season, which forms the socio-economic base for pastoral Maasai community in the area (Warinda, 2001). The swamp is also rich in biodiversity and constitutes an important wildlife refuge; as a result tourism development in the area is picking up and already two lodges with a 50 beds capacity have been developed in the last four years (Ndungu, 2006). Before Ewaso Ngiro River enters Lake Natron, it sinks into Shompole wetland where the sand and other river deposits are trapped. This helps clean the water before it enters the lake making it a breeding site for flamingos (Ibid)

2.7. Maasai Pastoralists and the Group Ranch System

2.7.1. Pastoralism

“Pastoralism is a pattern in which people make their living by tending herds of large animals” (Halderman, 1972). Examples of pastoralists in Kenya include the Maasai, who are the study community. There are essentially two forms of pastoralism: nomadic and transhumance/sedentary. Pastoral nomads follow a seasonal migratory pattern that can vary from year to year. “The timing and destinations of migrations are determined primarily by the needs of the herd animals for water and fodder. These nomadic societies do not create permanent settlements, but rather they live in relatively easily constructed dwellings the year round” (Hedlund, 1971). Transhumance pastoralists follow a cyclical pattern of migrations that usually take them to cool highland valleys in the dry season and warmer lowland valleys in the wet season. This is seasonal migration between the same two locations in which they have regular encampments or stable villages often with permanent houses. Transhumance pastoralists usually depend somewhat less on their animals for food than do nomadic ones.

Not all pastoralist societies can be accurately described as following a nomadic or transhumance way of life. As conditions change, pastoralists usually adjust. This can result in a traditionally nomadic society or some families within it becoming more or less transhumance in their migratory patterns if the opportunity arises. Likewise, a society that prefers a transhumance way of life may be forced by circumstances to change to a nomadic pattern for some or all of its livestock.

Pastoralism is most often an adaptation to semi-arid open country in which farming cannot be easily sustained without importing irrigation water from great distances. Pastoralism is usually the optimal subsistence pattern in these areas because it allows considerable independence from any particular local environment. When there is a drought, pastoralists disperse their herds or move them to new areas. Farmers rarely have these options. They suffer crop failure and starvation in the same situation. A pastoral subsistence pattern reduces the risk when there is an irregular climatic pattern. This is especially true of nomadic pastoralism (Halderman, 1972).

The animals herded by pastoralists are rarely killed for family use alone. Fresh meat is distributed throughout the community. This is the most efficient use of their animals because they usually do not have the capability of adequately preserving meat. Not only does it ensure that no spoilage takes place, but it also sets up numerous obligations to reciprocate within the community. It promotes cooperation and solidarity. Often the slaughter of an animal is for a ritual occasion so that its death serves multiple purposes. It feeds both the gods and the people (Halderman, 1972). Most pastoralists also get food from their animals without killing them; goats, sheep, cattle, and camels are milked. The Maasai community also bleeds their animals; the blood is mixed with fresh milk to make a protein rich drink. Pastoralist societies most often have patrilineal descent patterns and are male dominated. Men usually make the important decisions and own the animals, while women primarily care for children and perform domestic chores (Davis, 1970).

Among the Maasai community, mobility throughout altitudes and the resulting precipitation differences is important. Different animals are taken to different regions throughout the year, to match the seasonal patterns of precipitation. The actions of herders are carefully planned, but also constantly adjusted, to match changing conditions.

The system is dynamic, to suit the unpredictable weather conditions. All pastoralist strategies exemplify effective adaptation to the environment. Intrinsically linked with mobility is the complex “maps” that pastoralists keep in their minds, marking out the usefulness of certain areas at different times of year. Pastoralists have a detailed understanding of ecological processes and environmental inputs. Information sharing is essential for creating such deep knowledge. This is made possible by formal visiting rules and networks, keeping dispersed societies linked. Elders discuss and cautiously plan in advance; using the knowledge they acquire, in order to act in the most appropriate way (Ole Pasha, 1986). However, since the introduction of group ranch system in 1972, mobility of the Maasai community has been limited, disturbing the balance of pastoral system.

2.7.2. Group Ranch System

Formation of Group Ranches and their Effects on the Maasai

Group ranch is a form of land tenure in which a tribe, clan, section, family or other group of persons, whose land under recognized customary law belongs communally to the persons who are the members of the group with freehold title deed held by the group. When the Land (Group Representatives) Act was enacted in 1972 it stated that "each member shall be deemed to share in the ownership of the group ranch in undivided shares" (Government of Kenya, 1972). The group ranch concept represented a new approach to pastoral development and was a first attempt to radically transform a nomadic subsistence production system into a sedentary, commercially oriented system. It called for major changes in Maasai social and political organization and livestock management strategies. The group ranch development plan envisaged: adjudication of trust land into 'ranches' with freehold title deeds held by groups; registration of permanent members of each ranch; these members were thus to be excluded from other ranches; allocation of grazing quotas to members to limit animal numbers to the carrying capacity of the ranches; development of shared ranch infrastructure such as water points, dips, stock handling facilities and firebreaks, using loans. Members would pay user fees and be collectively responsible for loan repayment; members would manage their own livestock and would be able to obtain loans for purchasing breeding stock and cattle for fattening; a

group ranch committee would be elected to manage all group ranch affairs including overseeing infrastructural development and loan repayments, enforcing grazing quotas and grazing management, and maintaining the integrity of the group ranch boundary; and the group ranch committee would be assisted by a hired ranch manager and the extension service (Republic of Kenya, 1974).

Security of tenure was advocated as a key instrument in promoting the development of the pastoral rangelands. It was believed that security of tenure would reduce the pastoralists' tendency to overstock the ranges, increase their incentive to invest in range improvement and act as collateral for loans to invest in these improvements (Grandin et al., 1987).

Since the introduction of group ranch system, a lot changed in the Maasai community in terms of resource utilization and leadership. The effect of the organization of group ranches is demonstrated by one locality in north-eastern Kaputiei section. Before the group ranches this is thought to have covered about 310000 ha, all of which under the traditional system would theoretically have been available to each producer who was a member of the section, with three permanent water points and about 10 neighbourhoods. Member producers had free access to all the grazing and water sources throughout the locality. In 1970 the locality was broken up among four different group ranches. Members of each ranch retain close relationships with members of the other ranches; intermarriage is common, much gifting of livestock and other forms of sociability and mutual cooperation across ranch boundaries. However, there have been disputes between ranches over calf pastures that were formerly shared, over the location of new calf pastures and over access to surface water. Group ranches in Kaputiei section had a mean area of 16900 ha. Thus, from having potentially free access to 310000 ha of grazing, each Kaputiei producer has been restricted to only one twentieth of that area (Bekure et al., 1991).

Traditionally, Maasai local affairs were decided by groups or councils of elders on the basis of consensus. Producers who disagreed with the majority were free to go to another *boma*, neighborhood or locality. In contrast, group ranches required management by democratically elected committees with the authority to impose their will on members,

who are permanently tied to the ranch. Effective bureaucratic organization requires the virtual absence of prior ties among individuals, while democratic decision-making can be effective only in the absence of serious factions or when conditions prevent a single faction from dominating. These conditions are not met by the Maasai, with their complexities and tradition of individual autonomy. As a result, group ranch committees tend not to meet. If they do meet, they deal in non-controversial generalities or, if they address specifics, are unable to reach a conclusion. Even if the committee reached a conclusion it would not be able to enforce it (Dyson-Hudson, 1985). The group ranch system therefore faces serious management and resource utilization problems that many of them are pressing for sub-division.

Pressure for Subdivision of Group Ranches

According to Jacobs (1984), 29 of the 52 group ranches in Kajiado District have passed resolutions to subdivide. Seven of these had *de facto*, subdivided land equally among the registered members but were awaiting official adjudication and issuance of title deeds by the government, which will not permit subdivision while a ranch has loans outstanding. The remaining 22 were at various stages in the process leading to subdivision. Several had never functioned as group ranches, but used the group-ranch concept merely as a device to secure borders. The seven group ranches that had implemented subdivision were all close to urban centres, had areas of arable and irrigable land, and were among the first group ranches in the District. In contrast, ranches that had resolved not to subdivide had no arable land; they are all located in the drier parts of the western, southern and southeastern parts of the District. The only exception to this is Kimana group ranch, which has patches of irrigable land along the Kimana swamps (ole Pasha, 1986).

The desire and haste for individual tenure stems from a variety of factors including: wanting a title deed as collateral for loans, which are denied to group ranchers as individuals; frustration with the inefficiency of the organization/management of group ranches; a burgeoning group of mature young men who want their own land (and collateral) rather than a share of their father's land; fear of further land alienation,

enhanced by the government's inability to control squatting on group ranches; and a general move towards more individual production (Grandin, 1987a).

Those who are against subdivision have several interrelated reasons including the belief that while non-Maasai were kept out of Maasailand by the group ranches, these people would find it easy to buy individual holdings. This would lead to an influx of outsiders, especially farmers taking up arable land. In addition, the presence of large numbers of non-Maasai among the Maasai would result in the erosion and eventual loss of Maasai culture, which they want to see preserved. Finally, they believe that people holding individual title over a piece of land will tend to see that land as their private property and protect it as such. This will curtail the usual livestock movements across what was group-ranch territory. People who grow crops will be forced to fence their farms or gardens to protect their crops from wildlife and livestock, further restricting movement of livestock (Ole Pasha, 1986).

2.8. Summary of Literature Review

Several issues have been discussed under this chapter with a view to generating sufficient information to aid understanding of the challenges and opportunities to collective action in management of communal natural resources. From the literature review, it's quite apparent that collective action is easiest to identify when there is a clearly defined group that takes part. This indicates that bounding of the group, which allows people to know who else is contributing, fosters collective action. At the same time, in many instances of collective action it is not clear how the group is defined nor are boundaries necessarily fixed or rigid. Some people may participate one time, others another, with none of them knowing exactly who is involved, but all identifying with the collective action. For example, neighborhood clean-up activities may be done periodically without clearly defining who is in the 'neighborhood'. Thus, there is a gray area between organized and bounded collective action and action within more amorphous social networks.

In underscoring challenges to communal utilization of natural resources, conflicts have been acknowledged as an integral part of the process of human interaction and they are

intricately a continual fact of life in a society. With respect to natural resources, conflict is bound to arise from competing demands placed on resources by different claimants within the society. Even within a cohesive community of people, conflict may arise over resources as population increases causing demand to exceed supply hence strain on the resource base. Other factors that affect communal utilization of natural resources include political developments, socio-economic changes, and urbanization.

In efforts to foster collective action, initiatives have been made in the form of co-management' a way of addressing challenges that face it. These efforts demonstrate practical alternatives whereby external technical expertise serves to validate local knowledge, inform local action, and facilitate locally led initiatives, that are 'co-management'. This refers to arrangements whereby local people and their organizations are given responsibility for decision-making about access to and use of natural resources, in exchange for assured benefits, through agreements with government authorities and other stakeholders. Co-management covers a spectrum of arrangements — from formal legal agreements that are politically negotiated to informal pragmatic deals. Co-management options for poor marginal areas depend on several factors and how they interact: the nature of the resource to be managed, local rights to the resource, the institutions governing those rights and decision-making, and how the resources are exploited

Ecosystem services that need collective action to be sustainably exploited were also explored. These services include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious, and the nonmaterial benefits. In Shompole, chief among the services that the swamp offers to the community is grazing. It was realized that since the introduction of group ranches, mobility of pastoralists was severely limited. Among the Maasai community, mobility throughout altitudes and the resulting precipitation differences is important. Different animals are taken to different regions throughout the year, to match the seasonal patterns of precipitation. The actions of herders are carefully planned, but also constantly adjusted, to match changing conditions. The system is

dynamic, to suit the unpredictable weather conditions. All pastoralist strategies exemplify effective adaptation to the environment. Intrinsicly linked with mobility is the complex “maps” that pastoralists keep in their minds, marking out the usefulness of certain areas at different times of year. Pastoralists have a detailed understanding of ecological processes and environmental inputs. All these essential adaptation measures to pastoralism with ecological demands are now threatened due to the group ranch system. Furthermore, introduction of group ranches did not only affect grazing patterns, but also decision making structure in the community.

Traditionally, Maasai local affairs were decided by groups or councils of elders on the basis of consensus. Producers who disagreed with the majority were free to go to another *boma*, neighbourhood or locality. In contrast, group ranches required management by democratically elected committees with the authority to impose their will on members, who are permanently tied to the ranch. The desire and haste for individual tenure stems from a variety of factors including: wanting a title deed as collateral for loans, which are denied to group ranchers as individuals; frustration with the inefficiency of the organization/management of group ranches; a burgeoning group of mature young men who want their own land (and collateral) rather than a share of their father's land; fear of further land alienation, enhanced by the government's inability to control squatting on group ranches; and a general move towards more individual production.

CHAPTER 3

3. Research Methodology

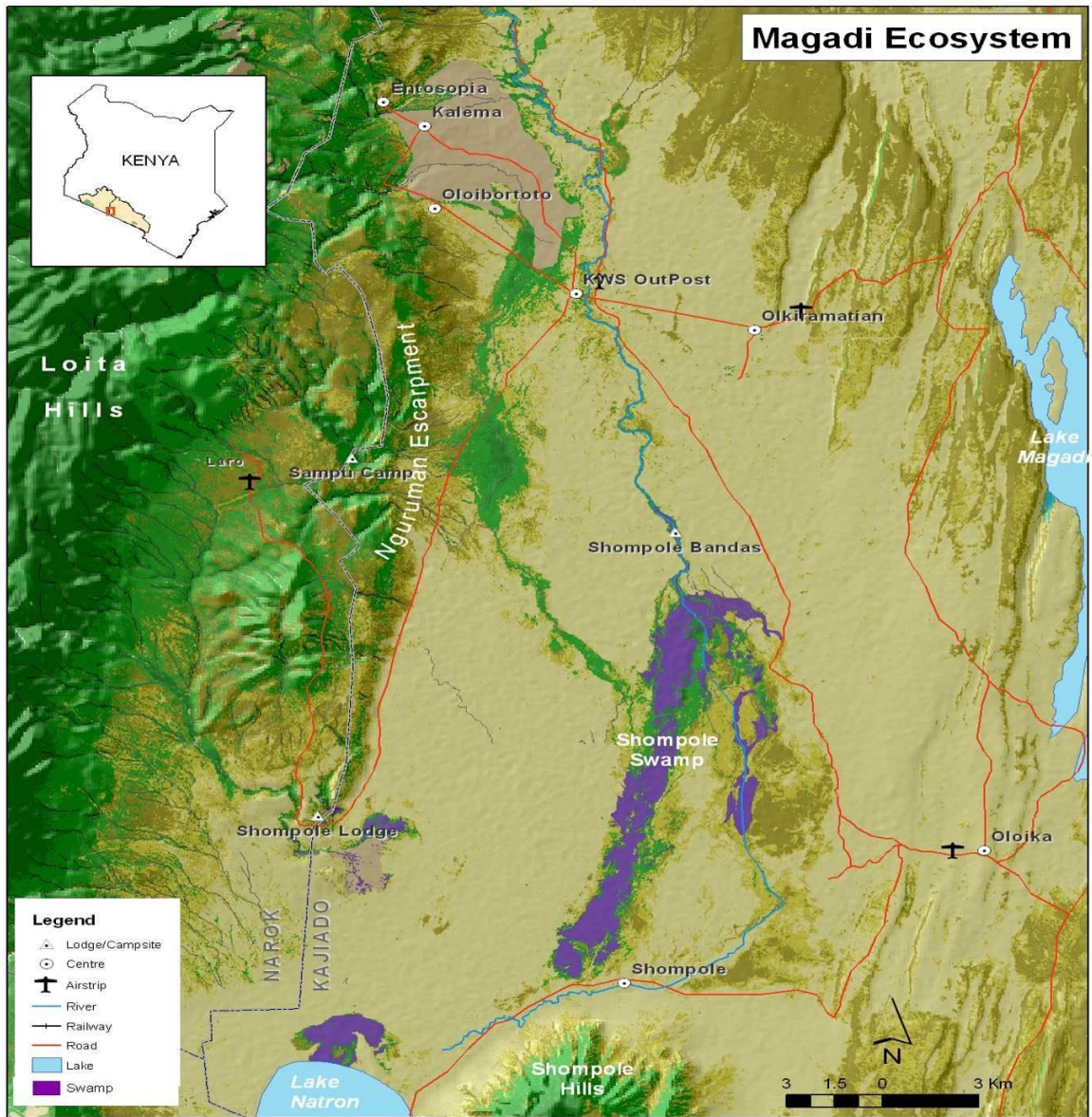
3.1. Introduction

This chapter gives an overview of the study area including study population and their modes of subsistence, climate and biodiversity, land use and land use changes in the study area, research design, and population and sampling procedure. The chapter further looks at methods used to collect data in the field, which were both quantitative and qualitative. Qualitative methods discussed include focused group discussion and key informants interview while quantitative method discussed is questionnaire survey. The chapter also looks at data analysis methods applied to the research.

3.2. The Study Area

3.2.1. Location:

The focus of the study was Shompole swamp which is located in Shompole Group Ranch, Magadi Division in Kajiado District. Magadi division is 2,608.99 sq km and occupies approximately 13% of the district. The division lies approximately 150km south of Nairobi and has four group ranches namely, Shompole (628.69 sq km), Olkiramatian (216.12 sq km), Ol Donyo Nyokie (685.66), and Olkeri (248.52 sq km). In total, the group ranches occupy 1778.99 sq km and the Magadi Concession Area, the area where Magadi Soda Company has been mining soda ash for over 100years, is 830 sq kms (Mwathe 2007). Shompole Group Ranch is situated about 35kms from Magadi town and it is to the South-western side of the division. It lies between latitudes 1°50' S to 2°05' S and longitudes 36° 00' E to 36° 10' S.



Map 1 is a map showing the study area

3.2.2. Climate

Shompole Group Ranch, which is the study area, can be divided into three zones, namely, western part of the area next to Nguruman escarpment, area west of Shompole hills and the central part which is classified as arid (Braun, 1980; GoK, 2002). The average annual rainfall is influenced by the altitude and the shadow effect from Nguruman hills. The rainfall pattern is bimodal with rainfall dropping from about 600mm at Entosopia in the

north of the study area to about 400mm at Magadi town in the south. The short rains fall between October and December while the long rains fall between March and May. The temperatures vary from 34°C at Lake Magadi to lower levels in high areas like Shompole Hills (Warinda 2001).

3.2.3. Biodiversity

The study area is a haven for wildlife, chief among them elephants, wildebeests, buffalo, zebra, giraffe, warthog, gerenuk, impala, grant gazelle and Thompson gazelle and coke's hartebeest. Carnivores include lion, hyena, wild dog, cheetah, leopard, and bat-eared fox. The area has also a variety of birdlife which includes flamingos, ostrich, kori-bustard and secretary birds (Warinda 2001). The main vegetation type consists of bushland, bush and wooded grasslands, riverine vegetation, grassland, semi-desert bushland and scrub. The plains around Shompole swamp have acacia species occupying large areas of swamp vegetation (Warinda 2001).

3.2.4. Land Use and Land Use Changes

Within Magadi division, the Maasai people still practice transhumant pastoralism, whose hallmark is moving from place to place in search of pasture and water. The domestic stocks kept are goats, sheep, cattle, and donkeys. According to 1988 livestock census, there were 37,430 cattle, 78,781 sheep, 53,014 goats and 2,355 donkeys in the division (Mpoke 1988). There is also growing population of camels in the area and also bee-keeping is being practiced (Mpoke 1988). In an effort to tap tourism revenue, Shomple group ranch established a conservation area of about 10,000 hectares and put up Shompole lodge and Shompole Domestic Bandas (Mwathe 2007).

3.3. Research Design

The research design that was employed in this study aimed at generating both qualitative and quantitative data. Quantitative data collected through questionnaire surveys was a follow-up on information generated during collection of qualitative data. Research methods that generated qualitative data included Participatory Rural Appraisal (PRAs)

methods using Focused Group Discussions and key Informants Interviews. PRAs methods were carried out in meetings of community members who understood how changes have occurred in the use of the wetland; for this reason, only elderly men who are charged with the responsibility of managing communal resources were members of the discussion groups. Questionnaire surveys were used to collect quantitative data. All data collected was aimed at presenting information on the challenges and opportunities in managing communal natural resources using the case of Shompole wetlands.

3.3.1. Field Work Process

In preparation for the field work, a community liaison officer who works for ACC in the study area was sent to inform community leaders and elders of the intended research so that they give consent, and also confirm appropriate dates for them to partake in the research. Field work involved carrying out Focused group Discussions as the first phase, followed by administration of questionnaires as the second phase. Necessary logistical arrangements were also made regarding venue for training of questionnaire enumerators, and focused group discussion facilitators, and recorders. The training started on 14th to 15th of March 2009, Focused Group Discussions (FGD) took two days (two sessions for each day) from 16th to 17th March 2009, while administration of questionnaires took 9 days from 18th to 27th of March 2009. Each questionnaire lasted on average one hour and twenty minutes, while FGD sessions were arranged in terms of morning sessions and evening sessions. Unlike administration of questionnaires, FGD took longer hours and involved participants taking soft drinks during discussions and sharing a meal at the end of the discussion. This was aimed at making discussions livelier, engaging and reinforcing the bond between the researcher and the community to facilitate free exchange of ideas.

3.4. Population and Sampling Procedure in Questionnaire Surveys

The Shompole group ranch has a total population of 8500 members (Group ranch records). According to African Conservation Centre's Resource Assessors data, there are a total of 412 bomas (assigned integers 1 to 412), each comprising of several homesteads in which they live. Simple random sampling was used so as to give each boma an equal

chance of being chosen (CRS 2007). Each element (boma) in the sampling frame was given a number of 1 to 412. Using a boma as unit of sampling, a Confidence Interval of 10 and Confidence Level of 95%, the Sample Size Calculator generated a sample of 78 bomas. The Confidence Level was chosen as 10 because the wider the confidence interval you are willing to accept, the more certain you can be that the whole population answers would be within that range (CRS 2007). The random numbers were generated using a random number calculator. In order to generate 78 random integers with each integer having a value between 1 and 412, the Random Integer Generator raised the following numbers:

337	146	218	83	169	243	345	278
406	23	154	35	73	394	81	378
24	193	14	31	179	175	324	354
343	195	299	133	256	177	337	234
304	281	43	198	349	50	321	345
165	204	386	347	201	281	132	131
97	192	290	361	188	308	268	182
23	79	264	97	240	336	340	275
32	333	236	178	326	100	231	36
3	113	356	112	164	215		

In each boma sampled and marked by a Geographical Positioning System (GPS), the oldest homestead was purposively chosen for interview because the study community vests authority in the oldest age-set in a boma regarding resource use. This process of sampling only applied to the administration of questionnaires.

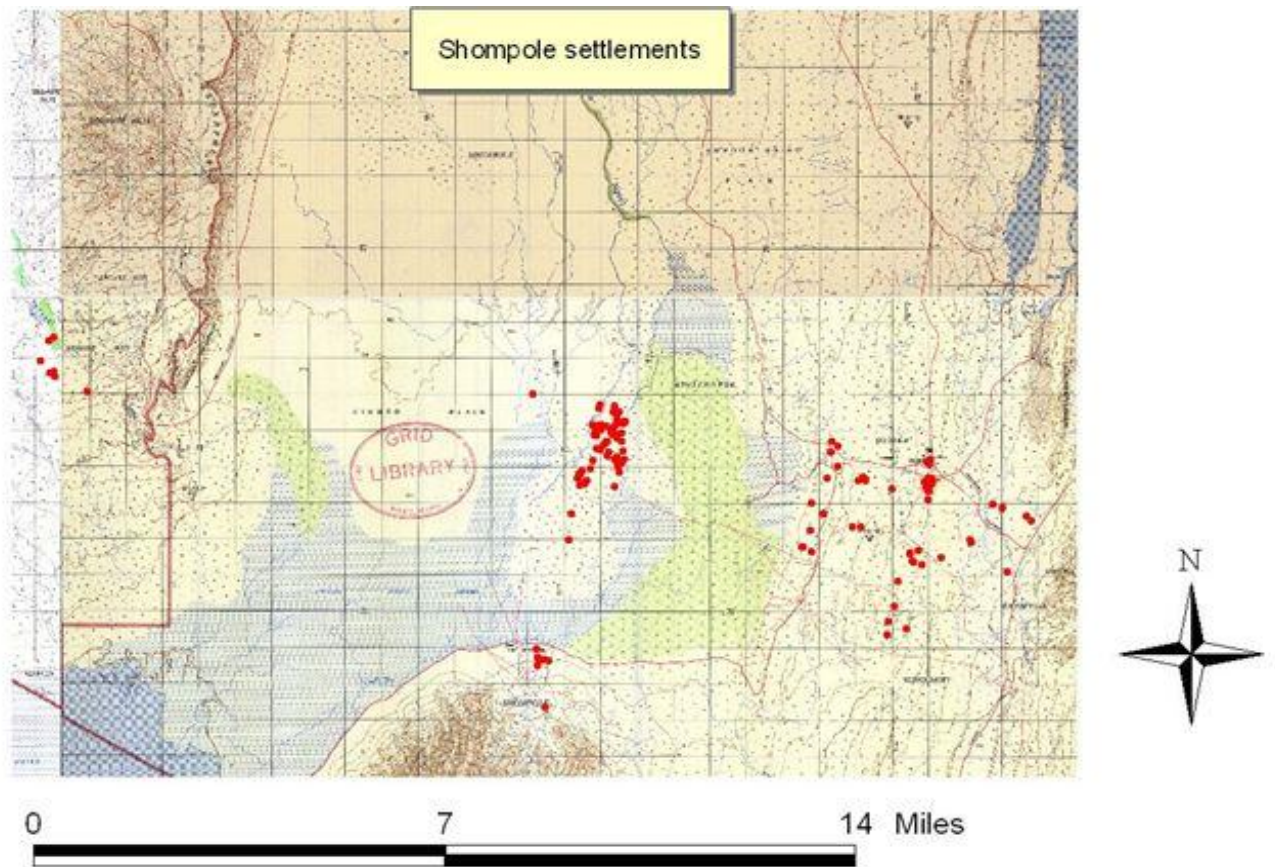


Figure 3 is a map showing settlements in Shompole Group Ranch. Source: ACC Resource Assessors data

Nature and Sources of Data

The study employed two categories of data types; the primary data and secondary data, collected from primary and secondary sources.

3.4.1. Primary Data

Primary data involved obtaining information directly from the field through use of Participatory Rural Appraisal (PRAs) methods, primarily inform of questionnaires that were in English but translated into Maasai, and key informants interviews as discussed below:

3.4.2. Focused Group Discussions

Debus (1986) says that to understand the perceptions, attitudes and practices of any population, focused Group Discussions (FGDs) can be a very useful tool. FGD is a group

discussion of approximately 6 - 12 persons guided by a facilitator, during which group members talk freely and spontaneously about a certain topic (Ibid). The purpose of FGD was to obtain in-depth information on concepts, perceptions and ideas of elderly community male members on Shompole swamp. The selection of elderly male members of the community of at least age 60 was purposive in order to achieve the intentions of the study because the community vests authority of resource use to elderly people with adequate experience. The idea was that group members discuss the topic among themselves, with guidance from the facilitator, who was part of the community. Before the allocation of areas to hold discussions, a general community meeting, attended by group ranch leaders, provincial administration, local political leaders and elders was held. This reconnaissance meeting introduced the subject matter to the community and sought approval by the leaders. Objectives of the study were explained to the community and the required process explained. The meeting was informed that participants in the FGDs should be roughly of the same socio-economic group or have a similar background in relation to the issue under investigation, and that the age and sexual composition of the group should facilitate free discussion.



Figure 4 is photo showing Focused Group Discussion in session at Pakase, Shompole Group Ranch

The community gave its approval and helped the researcher in coming up with a research team. This was necessary since the researcher was an outsider. A facilitator and recorders were identified during this meeting and were all community members. Since FGDs were going to be followed with questionnaire surveys, six enumerators of the questionnaires were also identified during this meeting so that they could undergo the two day training workshop. The protocol and guide to conduct FGDs was developed during this workshop. Each topic, formulated as an open-ended question was discussed within the objectives of the study and was finalized with the consensus of the group. The language was carefully selected to suit community elders, and at the same time in screened in order to meet the objectives of the study. FGDs were conducted and transcribed by the researcher and his team.

There were four FGDs held throughout Shompole Group Ranch, at strategic points advised by elders. Since participants had been identified during reconnaissance, they were invited in advance, and the general purpose and procedures of the FGD explained, in order to obtain their consent to join. The researcher kept quiet during the sessions since he could not understand the primary language used and spoke only when the discussion veered to him. During these discussions, the facilitator introduced the session, encouraged discussions and involvement, building rapport, and controlled the rhythm of the meeting in an unobtrusive way. The discussions looked at several issues, among them historical timeline and seasonal calendars:

Historical Timeline and Trend Lines: was aimed at documenting the community's heritage of experience and knowledge that influences present attitudes and behaviour towards the swamp and this immensely helped in exploring the indigenous knowledge systems. It generated information on how the community has historically dealt with natural resource (swamp) issues in the past. The time line went back as many generations as the community members could recall by 1949. Details on influential events that relate to the management of the swamp were recorded. Generation of time line was done by guided community group discussions with facilitation by the researcher, (Mikkelsen 2005)

Seasonal Calendar: the Egerton University PRA (2005) stipulates that seasonal calendar attempts to establish cycles or patterns of activities and occurrences within a community over a year. In this research, the calendar was to help present large quantities of diverse information in a common time frame in the way the community grazed in the swamp on a temporal scale. It helped in drawing a calendar of activities on how the community could actively participate in the governance of the swamp without interfering with their schedule. Moreover, seasonal calendar identified cycles of activity that occurred within the life of a community on a regular grazing basis, and helped determine whether there were common periods of excessive environmental problems (stress) or opportunities over the course of a normal year to help in the management of the swamp. Grazing of livestock in the swamp was analysed in the past and present in order to determine level of

usage and variations over temporal scale. These data were generated in community groups then quantified through questionnaires.

3.4.3 Key Informants Interviews

Face to face interviewing and telephone interviewing were used. Interviews were conducted on key informants selected, especially traditional community leaders, and other leaders of the community and key researchers in the area to find out benefits the community and its environs draws from the swamp, the social relations of resource users, procedures for monitoring and social sanctions to prevent free riding when rules are constructed, and challenges and opportunities to enhancing sustainability of the swamp. Among those who were interviewed in the field included members of the Shompole Conservation Trust, Shompole Group Ranch Committee Senior Chief, area Councillor, and members of Oloika women group; were totalling to nine interviews.

According to Mikkelsen (2005) interviews allow more complex and detailed questions to be asked; minimize misinterpretations and inconsistencies since these are easily checked by the interviewer. This method ensured the illiterate population was involved and also facilitated collection of more in-depth information. Telephone interviewing was made to community liaison officer who is both a member of the community and well grounded on issues regarding community resource management as a follow up on information that was not clear during the analysis and writing of the report.

3.4.4 Questionnaire Surveys

Questionnaires were prepared and administered during the second phase of the research as an in-depth follow-up on issues identified during PRA that needed detailed information. They were administered under the sampling procedure described under section 3.3 ‘sampling and sampling procedure in questionnaire survey’. For each boma selected, the eldest household was purposively picked to be administered with a questionnaire since the authority of resource use is vested in the elder. In the absence of the elder, his wife was picked, or in the absence of them all, the second eldest household

was picked for questionnaire administration. A total of 78 questionnaires were administered by six enumerators, each questionnaire lasting on average one hour twenty minutes. Since it involved movement, each enumerator was required to do just three questionnaires in a day and long distance movement was reduced by asking enumerators to work in the localities they represented when they were selected. Working in their on localities also improved the quality of information collected since they were administering to the people they know well.

3.4.5. Secondary Data

It entailed review of literature, including published and unpublished literature that was relevant. Secondary data provided opportunities for problem identification and definition was useful in generating viable alternatives to solve problems and it was used to generate solutions in the study area. Secondary data was obtained from reports, journals, books, newspapers and information from the internet.

3.5. Data Analysis

Questionnaire surveys data was entered on an excel template using codes. It was then analysed using statistical software, notably Statistical Package Social Sciences (SPSS) after being transposed to synthesize and compare categories of data, and show relationships through tabular or graphical presentation. The following analyses were done: chi-square tests, frequency analysis, and exploratory data analysis including histogram and radar/rose plots. The analysis was done by a statistician.

PRA data were analysed on two levels. After each PRA session, a preliminary analysis was carried out in the field. This made it possible to find errors that could be corrected (Chambers 1992b). After each focus group session the facilitator and recorder met to review and complete the notes taken during the meeting. An evaluation was made on how the focus group went and possible changes to be made in topics in the next focus group. A full report of the discussion was prepared reflecting the discussion as completely as possible, using the participants' own words. Key statements, ideas, and attitudes expressed for each topic of discussion were listed.

After the transcript of the discussion was prepared, coding of participants' statements, using the left margin was done right away. Finer sub-codes were made. Additional questions were formulated on issues that were still unclear or controversial and included in the next FGD. Once all the data was collected, it was summarised in a compilation sheet, organising the findings per topic. FGD interviews were given area names and key words used to summarise group statements in the compilation sheet so that it was easy to go back to the full statement. This was followed by systematic comparison between groups on all topics. An 'Objectives and problem analysis' diagram was used as a framework for analysis and comparison.

CHAPTER 4

4. Results and Discussion

4.1. Introduction

This section of the thesis report provides results from the qualitative and quantitative data that were collected in the field. For clarity and flow, results from questionnaires and focused group discussions have been integrated into discussions as a way of correlating with existing literature. The results and discussions are aimed at meeting the following objectives: Identification of resources of the wetland to the community and its environs and the changes that have occurred in their use; investigation of community rights, regulatory procedures, values and norms pertinent to the use of the wetland resources; investigation of challenges that hinder sustainable use of the wetland; and identification of opportunities for collective action for sustainable use of the wetland. In addition to these objectives, priority has also been given to the understanding of the socio-economic aspects of the study population as a way of laying the foundation for the discussions. This section has subsections such as socio-spatial and economic characteristics of the population; historical perspectives on Shompole swamp; ecosystems of Shompole swamp; dynamics in the management of the swamp; challenges to and opportunities for collective action in managing Shompole swamp; and application of CPR design principles on Shompole swamp.

4.2. Socio-Spatial and Economic Characteristic of the Population

This sub-section of results and discussion provides an outline of the social structure (as revealed both through focused group discussions and questionnaire surveys) of the study population as a basis for understanding the extent to which social relations shaped the community's use, of the swamp.

During Focused Group Discussions, it was revealed that the population in Shompole is organized into six basic units: house(s) (*enkaji*), household (*olmarei*), cluster (*boma*), locality (*enkutoto*), clan (*Oligata*) and section (*oloshon*). Several houses, signifying the number of wives a man has, together made up a household. A boma is a composition of

several households; the *boma* often jointly undertook herding, watering and other livestock management work, and resources such as food are also often shared. *Bomas* were clustered into larger units called locality/neighbourhood, which were quite some distance from each other; localities that were covered included Pakase, Oloika, Shompole and Enkobei. Each locality had a core of people who resided there permanently. Localities in turn formed a section; in this case the section is called *Olodokilani* with five major clans namely: *ilmolelian*, *ilmokesen*, *ilaitayio*, *ilaiser*, and *ilukumashi*. Community resources are freely accessible to those who are registered members of the Shompole Group Ranch. The clan was also the largest unit of traditional administration. It was noted that while it was easy for a household to move from one *boma* to another, sectional boundaries were, and still are, difficult to cross, even in drought times. Even if allowed to cross into another section, a herder would remain there for as short a time as possible and it was practiced as a matter of reciprocity. This concurs with the study by Bekure et al., (1991) on the *Ilkisongo* Maasai in Imbirikani Group Ranch, Amboseli.

Most respondents listed their main livelihood as pastoralism (nomadic 64% and sedentary 20%) (figure1)(A2) and the household was the primary unit of production. The nuclear family of husband, wife/wives and unmarried children was often extended to include married sons and their wives, the husband's mother (and his siblings if their father is dead). The household was therefore a locus of cattle production and other livelihood options (figure 1), and it was said to be independent in decision making as it regards food production hence natural resource use. Households were clustered together in large compounds (*bomas*). Each *boma* is comprised of several households ranging from as few as one up to seven, as shown in graph (histogram with normal curve) 1 below (A7).

Statistical analysis of question A7 in the questionnaire

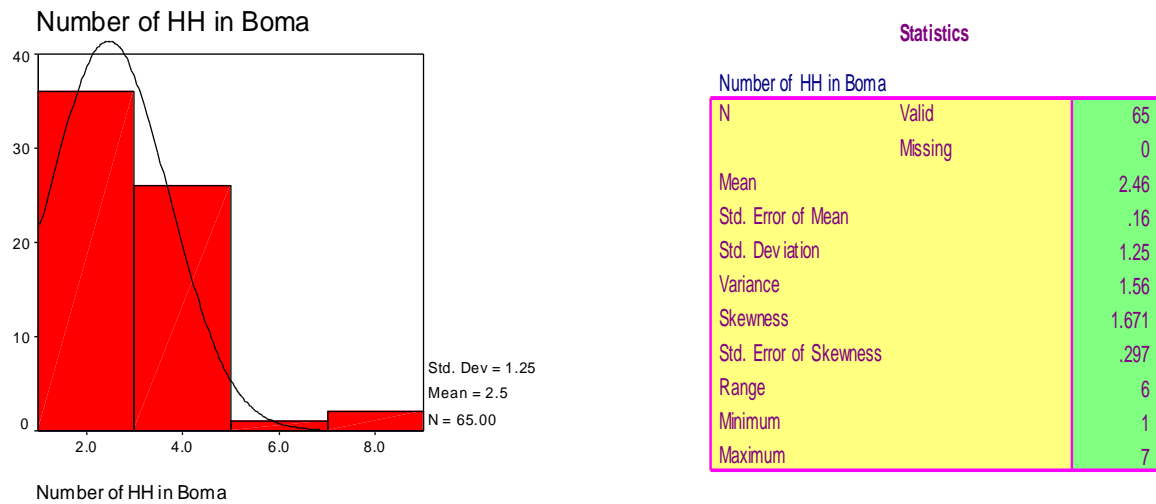


Figure 5 shows variation in the composition of households in a *boma*

In the statistic above, the maximum number of households in a *boma* was 7, with several single household *bomas*. Njoka, (1979) found the average size of the *boma* was 6.2 with a range of 6 to 12 households per *boma* in the Kaputiei Maasai in Amboseli, from 1978-79. On average as shown in the statistical tabulation above, there are just about three (2.46~3) households in a *boma*, against an average of nine (9) that was recorded in 1963 (Jacobs 1965) among the Maasai in the Mara. Although Shompole is different from Mara and Amboseli, this could indicate a decline, but other factors could be involved because there are differences.

It was noted during FGDs that neighborhoods and *bomas* are breaking down as individual producers spread out across the landscape, establishing individual *bomas* and often establishing their own individual calf pastures. Patterns of cooperation among Maasai seem to be beginning to change. For example, the declining size of the *boma* seems to be in response to the need for less cooperation in animal production and communal resource utilization. Respondents claimed that livestock numbers have declined drastically and thus there is less need for cooperative herding; due to fewer cattle.

Contrary to the general trend of declining household numbers in a *boma*, it was noted during the transect walk, there was a *boma* with about 36 households and a total population of over 112 people living together. Members included wives to the dead husband (founder), their married children and grandsons and some relatives. When asked as to why the *boma* was so big, it was said that the late founder barred his children from moving out of the *boma* or subdividing the wealth he had, lest they incur a curse. But more particularly on inquiry and observation, there seemed to be high reciprocity within members of the household in terms of food procurement and cattle management that holds the *boma* together. They shared most of the food when they slaughtered, they shared labour when looking after livestock, and they also had joint *olopololis*.

Respondents also reported that they are not marrying many women as they did in the past; they are now (question A3) an average of 2 wives per husband, a maximum of four, (figure 2). The bar graph with a normal curve that is skewed to the left indicates that majority of the respondents had spouses less than or equal to the mean generated

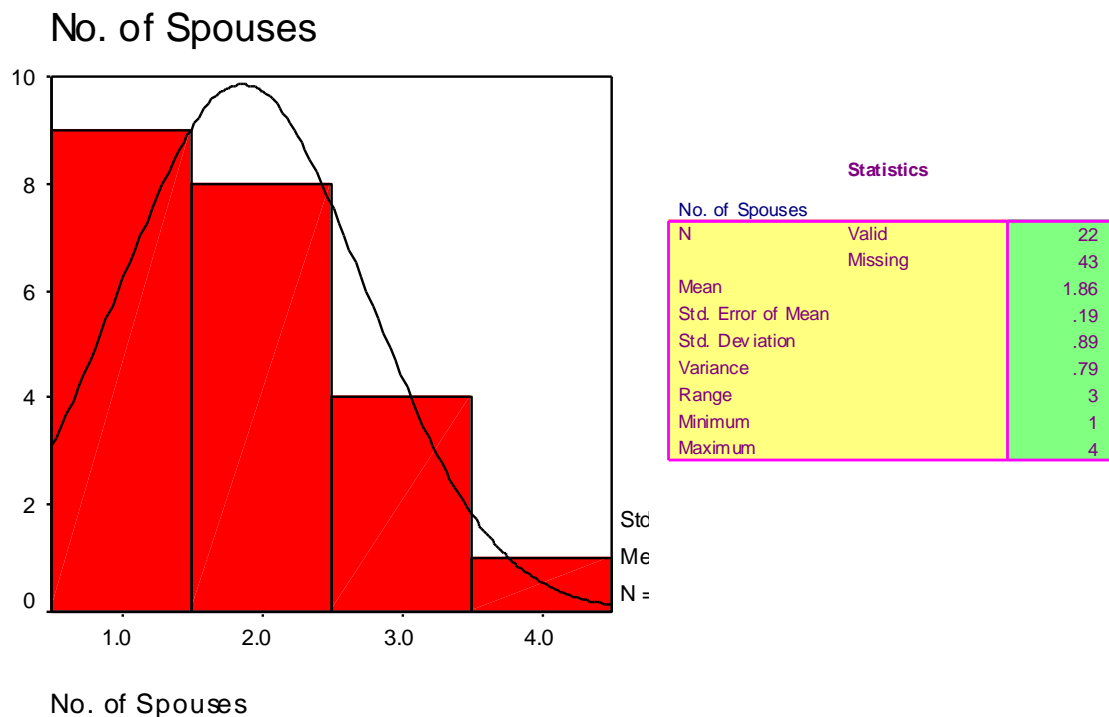
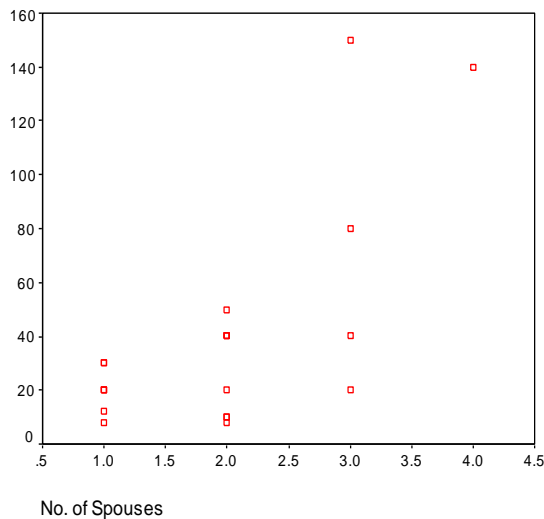


Figure 6 shows the number of spouses a man has in the study area.

The reported decline in the number of spouses as shown in figure (histogram) 3 with a normal curve (and also as shown in scatter graphs 3 and 4 below) is influenced by several factors. The discussions revealed that with many people opting for Christianity that prohibits multiple partners rather than traditional forms of religion that encouraged and tolerated polygamy, members of the study community are having fewer spouses. Education and modernization of the younger generation in the study area has changed their values and norms regarding marriage enabling them to embrace monogamy. The decline in the number of livestock, interpreted as the decline in wealth of the community is also cited as a major cause in the declining number of spouses men are marrying; increase in livestock numbers precedes the desire to marry many wives. There was also a significant relationship in the study area between the number of livestock one had and the number of wives one had. Results of question A3 was correlated to results of question B1: different types of livestock namely cattle and goat were weight against the number of wives a man had and the relationship was positive with significant correlation at the 0.01 level as shown in scatter graphs 7 and 8 below



Correlations			
		No. of Spouses	Number of Goats (of all ages)
No. of Spouses	Pearson Correlation	1.000	.694**
	Sig. (2-tailed)	.	.001
	Sum of Squares and Cross-products	16.591	469.400
	Covariance	.790	24.705
	N	22	20
Number of Goats (of all ages)	Pearson Correlation	.694**	1.000
	Sig. (2-tailed)	.001	.
	Sum of Squares and Cross-products	469.400	622261.590
	Covariance	24.705	16375.305
	N	20	39

** . Correlation is significant at the 0.01 level (2-tailed).

Figure 7 showing the correlation between the number of spouses one had and the number of goats one kept

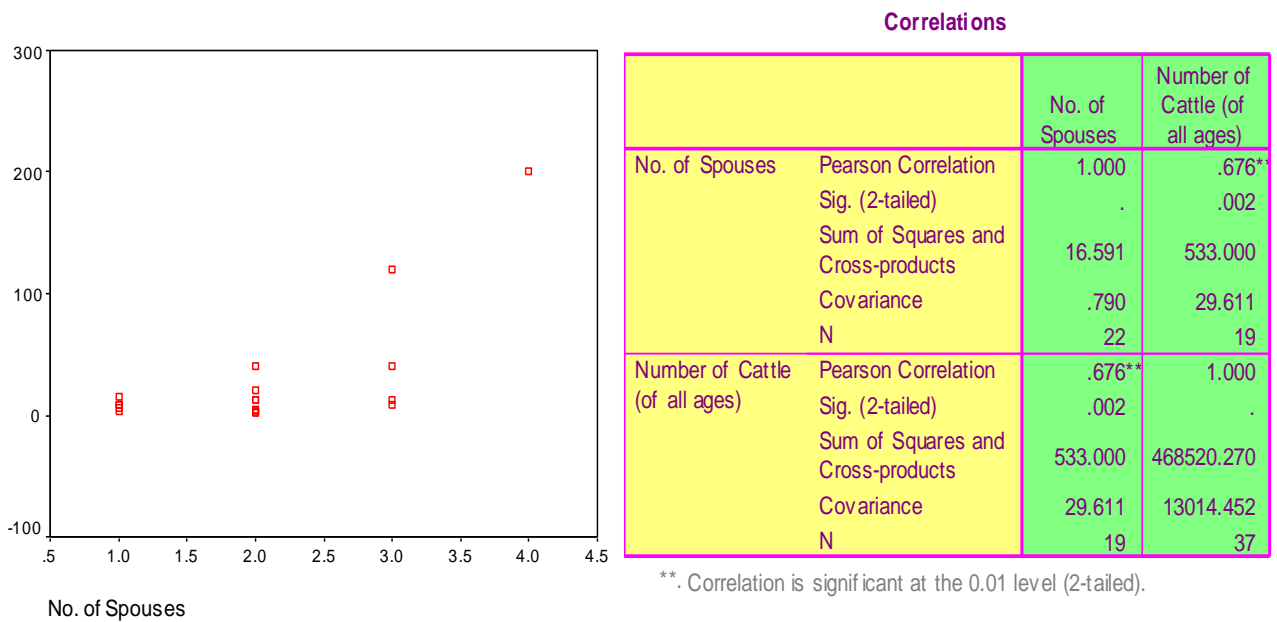


Figure 8 showing the correlation between the numbers of spouses one had and the number of cattle one kept

During focused group discussions, participants revealed that the number of livestock determined the number of spouses one had. It was said that when one's livestock increased, his social status in the community also improved and also demand for labour increased. Marrying another wife reinforced one's status in the community and also led to division of labour; one wife will take charge of goats while the other takes charge of cattle. Progressively, the more livestock one would accumulate the more probable that he will marry another wife. There were also cases of one having so many wives (about 3) with very little livestock. This was said to be more specifically as a result of natural calamities; as one increased his wives with increasing number of livestock, there may come a draught or disease that wipes out all livestock. One's wealth of cattle that led to marrying many wives is decimated but one is left with the wives. Bekure *et al* (1994) discusses the work women do regarding livestock keeping

Figure 9 shows major livelihood options of the study population. The percentages realized in the figures adds to more than 100%; this is because of the multiple responses in which a respondent was required to choose three options, ranking them in order of importance.

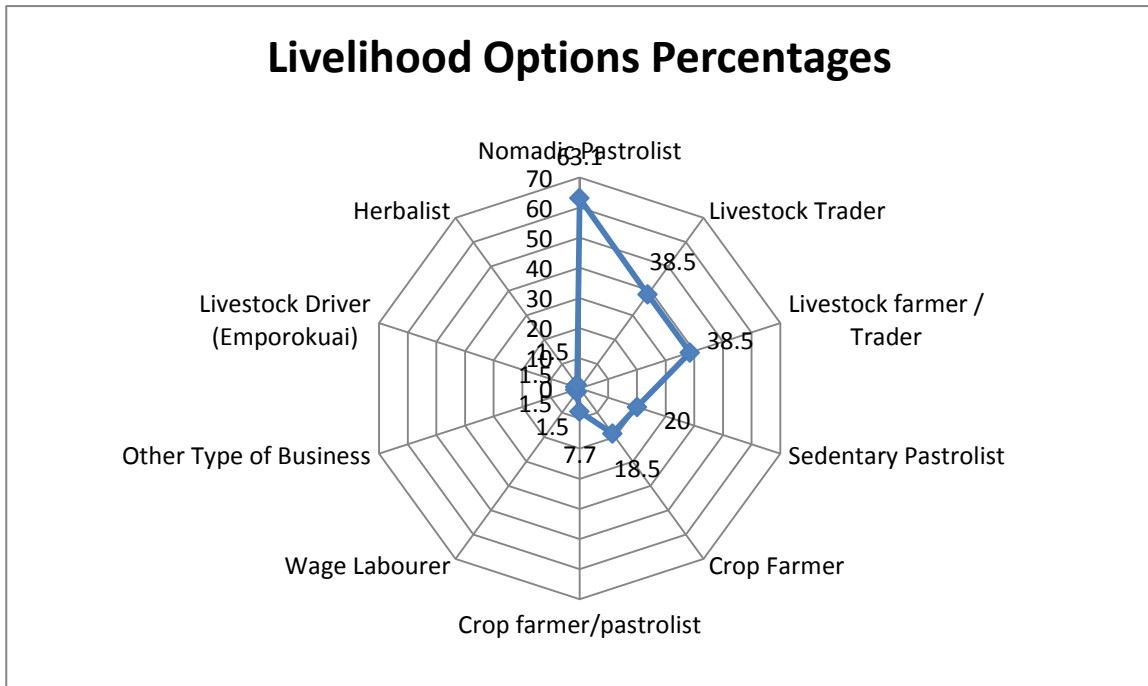


Figure 9 shows major livelihood options of the study community

The figure shows that pastoralism, in its twin forms of nomadic and sedentary pastoralism is the preferred and dominant form of livelihood practiced by the study population, with nomadic pastoralism accounting for 65% of responses and sedentary pastoralism only 20%.

Figure 9 further shows that livestock trading is also an important livelihood in the community with 38.5%, tying with those who combine livestock keeping and farming. Farming was also practiced in the upper side of the group ranch in Pakase, neighbouring the Nguruman escarpment where irrigation farming has been practiced for a long time, accounts for 18.5% of livelihood choices. Even in this area, livestock comes first then followed by crop farming other than the reverse; those who consider crops first then livestock second accounted for only 7.7% of the respondents. Those who live as herbalists accounted for a minimal percentage of 1.5, equalling livestock drivers (those who take livestock to the market to sell)

Grandin (1987a) noted that the traditional flexibility of the Maasai involved both spatial mobility and variation in the primary means of subsistence. He noted that long-standing descriptions of pastoral Maasai as living solely by direct consumption of livestock

products represents a stereotype which was probably achieved by most people only in good times. In support of this view, Bernsten (1979:109) explains that "the relation between Maa-speaking pastoralists, farmers and hunters was not static, but dynamic; individuals moved between these three modes of subsistence according to their economic status at a given time." Bernsten shows that in the past 150 years, agricultural settlements in highland areas in Maasailand "have been abandoned, resettled and abandoned again, depending on the fortunes of the pastoralists who occupied the plains."

In response to the question of which sector employed them, again livestock keeping topped the list with over 90%, followed by conservation (figure 6). Conservation enterprises have increased in the area as a result of the creation of Shompole Conservancy where Shompole Lodge and Loisiijo Bandas are located making the area a tourism destination. The facilities are run by or on behalf of the community. It should be noted that conservation and tourism in this case are interrelated, and often the community does not make a distinction. The community noted that the conservancy has led to an increase of wildlife numbers in the area; since the swamp is also within the conservation area and is a major wildlife haven during dry periods. Agriculture and civil service is also playing some role in the employment of members of the study community. As the results in graph 10 show, the major sectors in which most members of the community are occupied are livestock keeping and conservation; these two activities are in turn sustained by the swamp. This highlights the central role of the Shompole swamp to the population under study.

Sector Employed

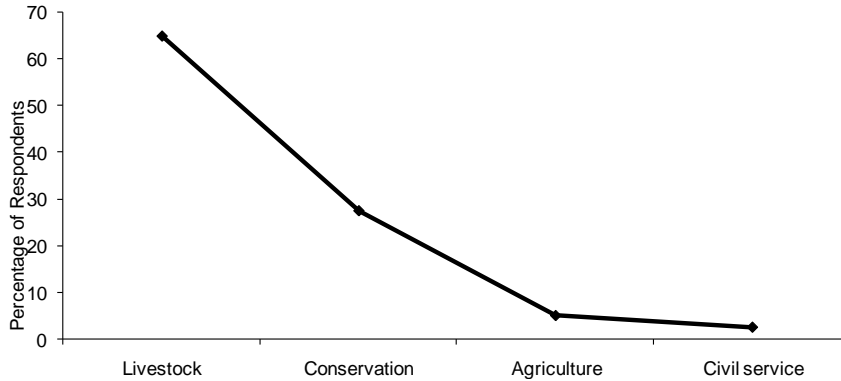


Figure 10: shows employment of members of the study community by sector

4.3. Ecosystem Services of Shompole wetlands:

In this sub-section, ecosystem services derived from Shompole swamp are discussed. The focus of this set of questions was the identification of resources of the wetland to the community and its environs and the changes that have occurred in their use. The results of information are derived from questionnaires and focused group discussions. The swamp provided a range of services, including provisioning, regulating, and support services to human wellbeing.

Respondents were asked what they have used the swamp for. They listed various uses, chief among them grazing their livestock especially during dry periods. Other use included a wide range of ecosystem services including procurement of medicine for both human and livestock treatment, food (fish), water supply for domestic uses, water purification before the Ewaso Ngiro River drains it into lake Natron, flood regulation, recreational opportunities, and, increasingly, tourism. Though most members of the study

community are averse to eating fish, there is a significant population of immigrants living near the swamp at Shompole trading centre where they carry out fishing of mudfish and catfish for household use and also for commercial purposes, though on a limited scale. Shompole wetland is also becoming the epicentre of tourism activities in the area especially during the dry season as most of wildlife, notably grazers, conglomerate there.

Respondents were asked to list commonly sighted wildlife in the swamp and how they use them (B5). The figure below shows percentage of respondents who sighted different species of wildlife at the swamp during the dry season; again, it's a multiple response hence percentages add up to more than 100%

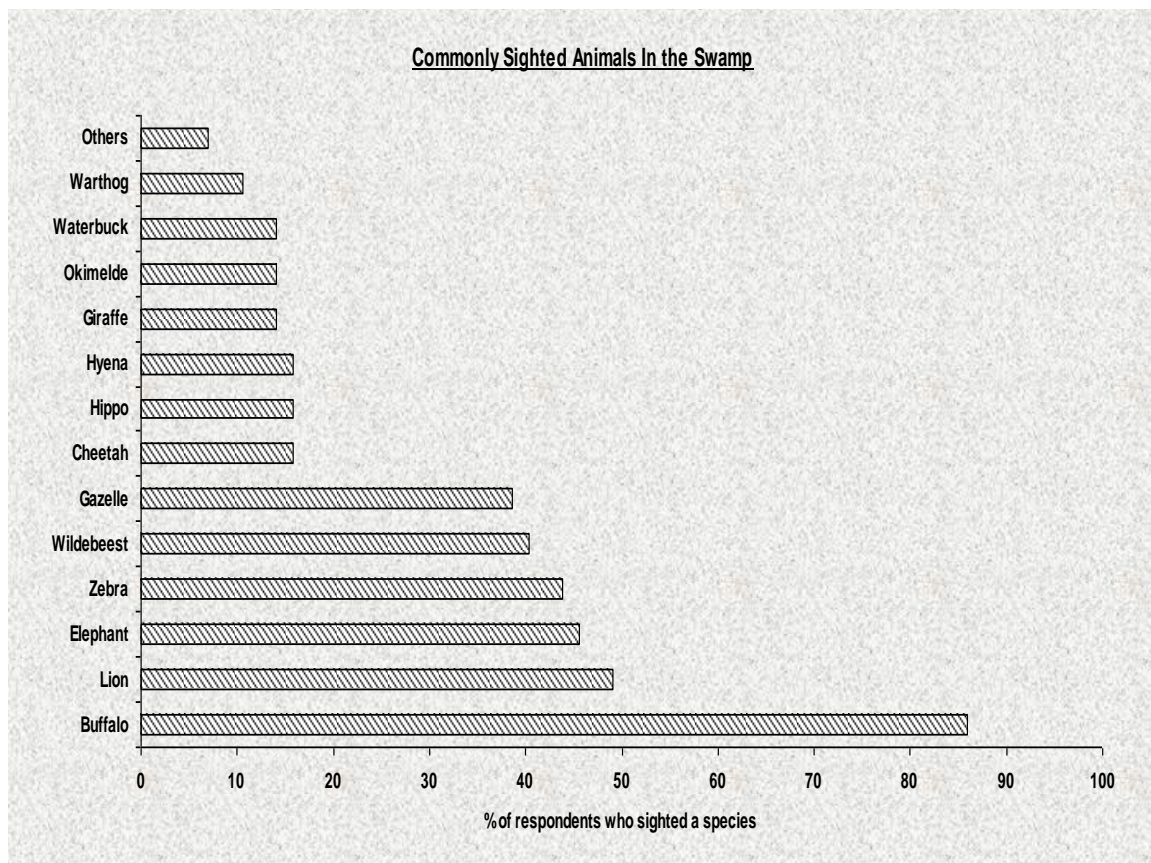


Figure 11 showing commonly sighted wildlife at the swamp during the dry period

It is noted from the bar graph above that most of the wildlife that attracts tourists, commonly referred to as the ‘big five’ were reported to have been often sighted at the

swamp during the dry period, though in varying degrees; they include buffalo, elephant, lion, and leopard. Of those sighted, buffalo were the most common(86%), followed by lion (50%), then elephant (48%), zebra (45%), wildebeest (42%), gazelles (40%), and others (Cheetah, Hippo, Hyena, Giraffe, waterbuck and warthog) (less than 20%). Grazing of livestock at the swamp (extensively discussed under changes in the use of the swamp) is held by the community as a major ecosystem service of the swamp.

Respondents were asked to list plant species that are available in the swamp and how they use them. The following plants were listed as being commonly found in swamp: papyrus reeds, elephant grass, sedge grass, *Pennisetum mezianum*, *Themeda* ssp, Bulrush, *Ipomea* ssp, *Kalachoe* ssp, *Justicia* ssp *Cordia* ssp, *Vangueria infausta*, *Carisa edulis*, *Ficus sycomorus*, *Cucumber* ssp, *Salvadora Persica*, *Syphostema* ssp and *Acacia xanthliphloea* The respondents said that plant species found in the swamp are used by the community in a diversity of ways as shown in graph 12 below.

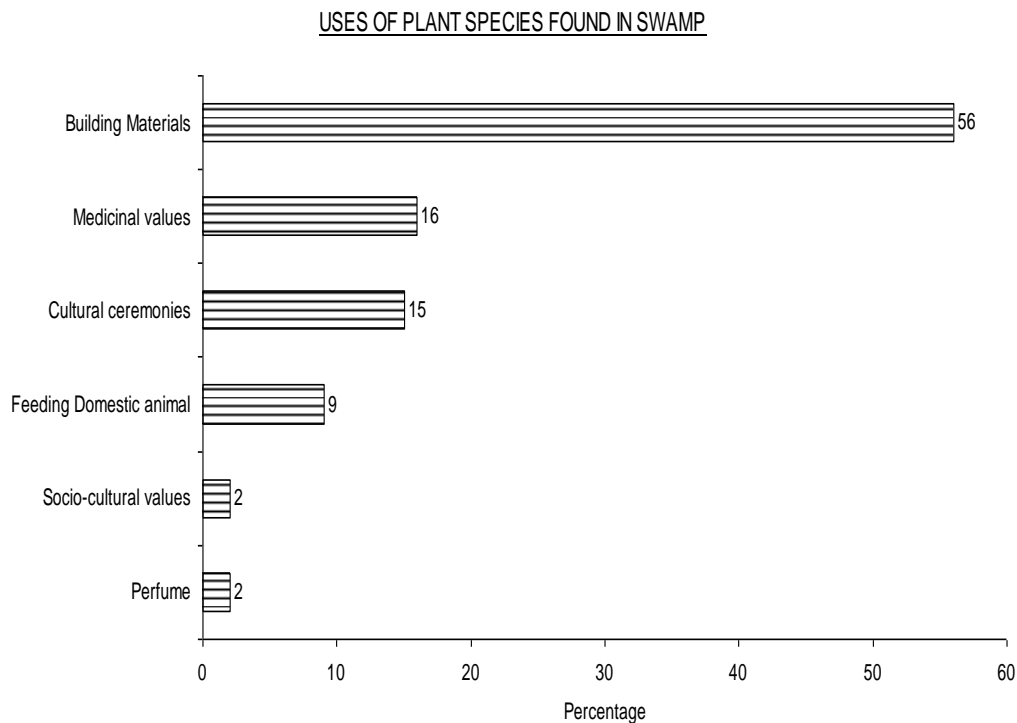


Figure 12 showing usages of plant species found in the swamp

The bar graph above shows that plant species found in the swamp are used by the community for a variety of purposes including: building materials (56%), production of medicine both human and livestock treatment (16%), carrying out cultural ceremonies (15%), socio-cultural (2%), and perfumes(2%). Note the inclusion of ‘feeding domestic animals’ (9%); this is not the same as grazing, its feeding lactating or sick animals which is not limited to dry grazing period.

During focused group discussions the rain making cultural ceremony locally known as *embolosare* that is held at the swamp by the community to appease the gods when the community experiences prolonged droughts was discussed; specific grass (*Ficus thonningii*) used during the ceremony can only be obtained from the swamp. The ceremony that is presided over by *Oloibon*, involving sacred invocations and slaughtering of the best bull whose blood is mixed with traditional brew made of honey (is also

obtained near the swamp) for drinking, was said to result in rain instantly. Table 1 lists other ecosystem services derived from Shompole wetland.

Table1 showing ecosystem services derived from Shompole wetland

Ecosystem services derived from Shompole wetland	Specific wetland resource	Examples
Food procurement for human consumption	Plants and wildlife	Production of mudfish, catfish, and wild roots and fruits eg <i>Typha folia</i> (bulrush). <i>Cordia sinensis</i> (ssp Oliva tree), <i>Salvadora persica</i> (brush tree), <i>Ficus syncomora</i> (Fig tree), are obtained from the swamp and used for human food
Fresh water	The whole wetland ecosystem	Storage and retention of water from Ewaso River for domestic use
Fibre and fuel	Wetland plants	<i>Cordia synensis</i> posts for building houses ad cleaning containers, <i>Ficus sycomorus</i> is used for building lodges
Animal feeds	Wetland grass	Star grass for grazing of livestock during dry periods
Medicinal values	Wetland biota (Plants and animal) perfume	<i>Cordia sinensis</i> bark of the roots are extracted to produce medicine for stomach ache while its leaves are used for curing eyes ailments <i>Salvadora persica</i> seeds are used for treatment of common cold by eating the seeds directly or peeling the root back, crushing and mixing with tea leaves. Root bark can also be used for inducing diarrhoea. Elephant dung used as medicine for chest problems amongst children Zebra fat used for treating tuberculosis <i>Cena dedebotria</i> is used for getting perfume which women use.
Cultural ceremonies	Swamp site or plant materials	Rain making ceremonies conducted in the swamp or plant species called <i>Ficus thonningii</i> back of the tree are taken for making string used for blessing during the rain-making ceremonies The same tree and the swamp is also used for blessing barren women to get children by selected spiritual elders Some wildlife found at the swamp especially buffalo have horns that are used for traditional dances Some moran initiation ceremonies are also carried out at the swamp
	River banks	The community organizes meat-eating camps by warriors and young elders to “built up their proteins” in preparation for raiding.
Tourism	The whole ecosystem	During dry period most of the wildlife is found in the swamp therefore attracting many tourists who come to the ecotourism facilities in the area.
Educational/scientific	The swamp ecosystem	The swamp has been studied by both local and foreign researchers
Aesthetic		The community finds beauty and aesthetic value in the aspects of Shompole wetland especially the landscape. This is also attracting tourists
Ornamental value		Some wildlife found at the swamp such as kudu horns have skins that are used ornamentally such as decorating, and for sewing clothes and rope.

4.4. Historical Perspectives of Shompole Swamp

This sub-section of result and discussion was mainly derived from focused group discussions when respondents were engaged in historical timeline on the use of the swamp. The recollection of events by respondents went from 1949 to the present. They discussed events that influenced the use of the swamp, changes in the management system of the swamp, and also changes in community user rights of the swamp.

Through the Historical Timeline, the respondents explored changes that have occurred in the management and use of the swamp. It was realized that the uses of the swamp were intricately related to changes in land use policies and tenure that were happening in the country as a whole, but specifically policies related to rangelands such as the creation of the group ranch system and periodic droughts that are a factor in rangelands.

From the timeline below, it's realised that the community applied different strategies for using and managing the swamp depending on the prevailing conditions in limitation to the capacities of community institutions. It was understood from the focused group discussions that the community did not particularly like using the swamp, unless they were under duress from drought; even so, they would avoid some sections and graze interchangeably with dry grasslands. Unlike the collective use of the swamp, the river draining into the swamp was used and managed as private property, limited to *boma* or *enkutoto*; subdivisions were made along the river as to where a *boma* would water their cattle. From the year 2001 when the community set up a conservation area, strategies changed and a new concept of comanagement was introduced. This item shall be discussed in detail in the section: *application of CPR design principles on Shompole wetland*

In 1949, farmers from non-pastoral communities especially the *Gikuyu* moved into Nguruman escarpment where they started small-scale farming. Though the area of land involved was small, it was very important because it was land that provided critical dry-season grazing. A severe drought in 1950 increased conflicts between the Maasai pastoralists and non-Maasai farmers in Nguruman escarpment; as a consequence, four families from Oloika locality grazed in the *Olongarua Lekikuro* swamp, which was small

in size by then and they had never used it en-masse before; the families were Olotanchu, Olo Lesile, Ole Namowo, and Ole Sonto. In 1951 the County Council was given the power to restrict cultivation under Land Usage Bye-Laws. A state of emergency was declared in 1952 and farmers were repatriated to their own reserve, temporarily reducing cultivation in Nguruman escarpment. A detailed timeline of events regarding land utilization of the swamp is given below:

Table 2 showing timeline of events on the swamp

Period/ year	Topical Events	Comments
1949	Farmers from non-pastoral communities especially the <i>Gikuyu</i> move into Nguruman escarpment where they practiced small-scale agriculture, in addition to old schemes run by <i>sonjo</i> people who had been there for long a time	Though this was on a small-scale involving a small area of land, it caused strain on critical dry-grazing areas and the community needed to change strategy
1950	There was drought during which four <i>bomas</i> from Oloika locality took livestock to the swamp for the first time.	Most of the livestock died of what the respondents called mysterious diseases from the swamp. At this time, there was limited treatment of livestock using conventional medicines. This drought increased conflict between the Maasai and the non-pastoralist community farming in Nguruman
1951	County Council was given the power to restrict cultivation under Land Usage Bye-Laws	This temporarily halted expansion of farms into dry-grazing areas in Nguruman
1958-61	There was a severe drought that for the first time in memory of respondents River Ewaso Ngiro dried up. People moved to Kikuro plains so that they could access water from Pakase River.	The drying up of the river meant that the swamp also had no water. Slowly, the community started grazing livestock in the swamp. This drought marked the advent of large-scale utilization/grazing of the swamp
1961	The colonial government was not happy with the community settling in Kikuro plains and therefore they tried to divert river Ewaso Ngiro at Elangata Omutukani to the east river course using machinery. This was unsuccessful.	During this period the original swamp was heavily grazed as the waters of the river had diverted creating <i>Engoiboni</i> swamp
1961	Later in the same year, to what respondents think it was acts of magic by their traditional chief, <i>oloibon</i> , to where due to heavy rains the river diverted back to its original east course	The use of magic was a strong cultural asset for resource management. At the time, the community heavily used taboos and cultural norms in enforcing rules set for the use of the swamp

Period/ year	Topical Events	Comments
1962-63	The area received two continuous seasonal rains such that there was sufficient grass.	Cattle were not taken to the swamp at this time. However, shoats and lactating cows were taken there since it was said that the swamp had grass that increased milk production. The community instituted punishment modalities through the council of elders for those who defied the rules.
1973	The earlier three <i>bomas</i> whose livestock had died in the swamp pioneered frequent grazing in the swamp. They were later joined by five Shompole <i>bomas</i> namely: Oleshani, Olekoili, Olesempeyo, Olenjakua, and Ole Sarinke Leriro families. At this time also, the government broached the idea of group ranch system	From this year on-ward, the grazing patterns in the swamp changed completely and annual period of grazing at the swamp continually increased in span. However, this did not have much impact as there were sufficient rains and the swamps continued to change positions and numbers in subsequent years. The group ranch system was intended to transform pastoral subsistence into commercial ranching
1981	Due to the flooding of the Ewaso Ngiro River at the east river course, <i>Engoiboni</i> swamp was formed which later expanded to the north west to form the <i>Noltareto</i> swamp and to the south east formed <i>Ilangeluani</i> swamp	This is the complex of swamps that exists now. At this moment, there was no form of monitoring applied to the use of the swamp.
1992	<i>Olungarua Lonkeki-pusi</i> swamp formed further north towards Lenkobei settlement which became commonly used by Olkiramatian and Lenkobei settlements particularly graze goats, and lactating cattle	The community started limiting use of specific component of the swamp to specific localities, namely shompole and Oloika locality used certain sections while Olkiramatian and Lenkobei used the remaining sections.
1993-95	The two swamps, that is <i>Olungarua Lonkeki-pusi</i> and <i>Noltareto</i> were continually used while <i>Ilangeluani</i> swamp's ecosystem changed to a shrub-land due to the diversion of the river to the central river course	The non-use of <i>Ilangeluani</i> swamp for grazing increased pressure on the other two remaining swamps leading to frequent depletion of vegetation.
1996	There was a prolonged dry spell, leading River Ewaso Ngiro to dry up for the second time, to an extent that the dependants dug wells on the river bed and all the swamp ecosystem almost disappeared due to heavy grazing	Every time there was a prolonged drought, the community through its various organs instituted rules for the use of the swamp. This time, it was agreed that only weak livestock would be grazed in the swamp while healthy ones be taken to foreign fields especially Oldonyo Sampu Hills in Tanzania. Cultural norms, and more specifically taboos were used to make sure members obeyed the rules

Period/ year	Topical Events	Comments
1998	There came El Nino rains that flooded the rivers and burst the banks and returned the river to the eastern side old route of 1961; which led to replenishing the renewal of Kikuro river	The El Nino rains led to the swamp increasing in size due to a lot of water from the river. At this point with abundance in grass at all grazing grounds, the community forgot about the use and management of the swamp
2001	A conservation area was created encompassing most of the swamp, which its eastern boundary was meant to be the Ewaso Ngiro River. The community therefore asked an NGO to help in diverting the river to its central route or go further west to re-establish Noltareto swamp and leave the eastern side of the river for the conservation area. It has not been done yet.	At the formation of the conservation area, a modern concept for promoting community conservation of biodiversity, the punishment for defying rules for the use of the swamp changed. A fine of Ksh 10,000.00 is imposed on those who use the swamp times that are not allowed by the Conservation Trust. Conservation game scouts are also used irregularly as monitors of the swamp The conservation area is under Shompole Community Trust (group ranch executive, lodges representative, 5 sub location reps and co-opted members like KWS, ACC, Magadi Soda, individual stakeholders) management, usage determined by the trust and lodges Rangers who patrol conservation areas with two main entry points manned by rangers. Rangers are employed by the trust and they are community members, paid from the conservation fee.
2006 to date	Since 2006, rains have been sporadic in the area, with severe drought being experienced from the year 2008. At the time of field work, the drought was severe and carcasses of wildlife could be seen in many places.	From 2008, the community has spent most of the time tending their livestock in Oldonyo Lengai in Tanzania, occasionally coming back to the swamp which is clearly decimated. For those who remained with fewer livestock in the area, are burning hardy grasses to regenerate new ones

4.5. Challenges to and Opportunities for Collective Action in the Use of the Wetland

In this sub-section, data was mainly derived from focused group discussions, with sections being derived from the questionnaire. The sub-section sought to express challenges to and opportunities for communal use of the wetland. The discussion is centred on the dynamics of demography and changes in the grazing cycles, and also dynamics in the management of the swamp traced historically.

4.5.1. Dynamics of Demographics and Changes in the Grazing Cycles of the Wetland

Annual Grazing Cycle and Frequency

The historical timeline established that in the year 1950, four families from Oloika locality, namely Olotanchu, Olo Lesile, Ole Namowo, and Ole Sonto grazed their

livestock in the swamp, albeit as the last option in search of grass. However, this is not to say that the swamp was not used before then as FGD progressively revealed old traditional systems of swamp management that they applied, only that the discussants could not vividly remember events prior to 1950. By 1973, grazing in the swamp increased dramatically and about three months of September, October, and November were fairly spent grazing livestock in the swamp; as shown in the annual grazing cycle figure 13. At this time, Jacobs (1984), in an analysis of population growth in the rangeland districts of Kenya between 1969 and 1979, calculated that the population of Kajiado District increased by 74% or 50% above the average increase for Kenya as a whole. However, only half this growth was due to an increase in the pastoral population, the remainder being accounted for by in-migration from surrounding districts, of mainly farmers. Between 1948 and 1984 the human pastoral population of Kajiado District increased steadily from about 29000 to 109000 people. In the study area, increase in population and reduced grazing area was also attributed to Magadi Soda Company, which took part of the land as a concession area.

As the human population increased, there was need to increase the production and subsistence base, which was mainly livestock, to meet the demands of the increasing population. The need to increase livestock production coincided with the occupation of wet areas (Nguruman escarpment) that were dry period grazing zones by farmers. At this point, respondents said the community started looking at the swamp as a key grazing area option during dry periods. Augmenting the swamp are reserved grazing areas strategically located in the group ranch, some located along the Ewaso Ngiro River. Dry grazing areas, *olopololis*, are boma owned and the boma controls their use. The map below shows locations of the *olopololis* in the Shompole group ranch. Figure 13 compares grazing frequency as of the past and now.

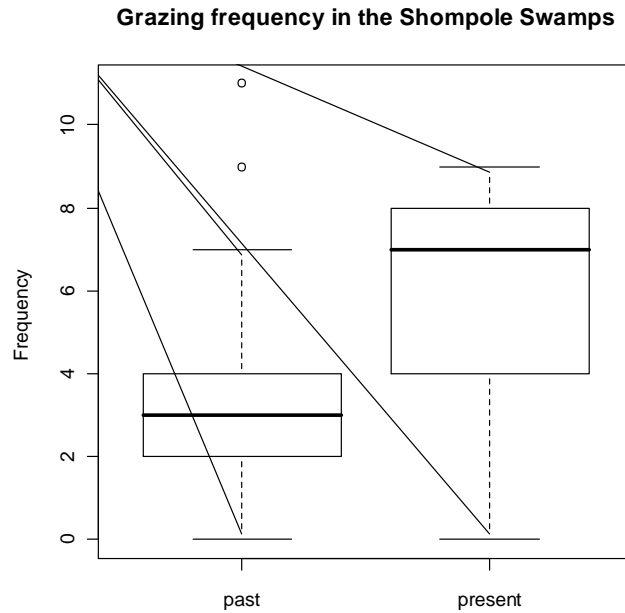


Figure 13 compares grazing frequency in the past and now

Focused group discussions noted the increase in human population as an important factor contributing to competition over the use of the swamp. As population increased unevenly due to varied sizes of localities that included Oloika, Shompole, Lenkobei and Pakase, there increased demand for grazing areas hence accentuating imbalances in grazing area availability, inducing pressure on the wetland. As the number of parties competing for grazing in the swamp increased (at the family/*boma* and community levels) and possibilities for migrating with livestock became scarce due to creation of group ranches in the area, every possible strategy was employed to increase the strained capacity of the wetland to sustain grazing during dry periods. As shown in figure 16, the community is now setting fire on dry hardy grass to enable quicker regeneration of green grass so that livestock can graze there. The burning of the wetland is affecting the composition and sustainability of the wetland as many animals are killed or displaced by fire.

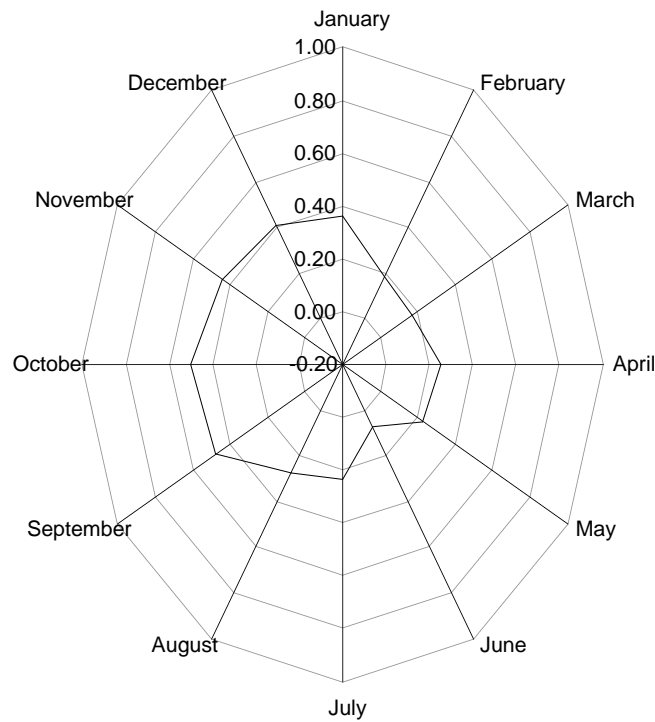


Figure 14 showing grazing cycle in the Shompole swamp in the past

Use of the swamp progressed from 1950 when it was used by few families for a short period of less than a month, to 1970 when it was being used for three months by more people. However, even at this period, the respondents said that only weak and lactating livestock were being grazed there entirely for the dry period, otherwise most livestock would utilize *olopololis* then once they were decimated, moved to foreign fields especially Oldonyo Sampu Hills in Tanzania. Figure 15, shows the grazing frequency encompasses all months of the year, peaking in June, a month that was never used for grazing in the swamp in the past. This could be attributed to changing weather patterns where wet seasons have changed and there are increased prolonged droughts in the area. In sum, the community now relies heavily on the swamp to sustain their livestock, all

year round. However, it was noted emphatically that the swamp remains a reserved grazing of last resort to many when the season is not good because of diseases associated with it.

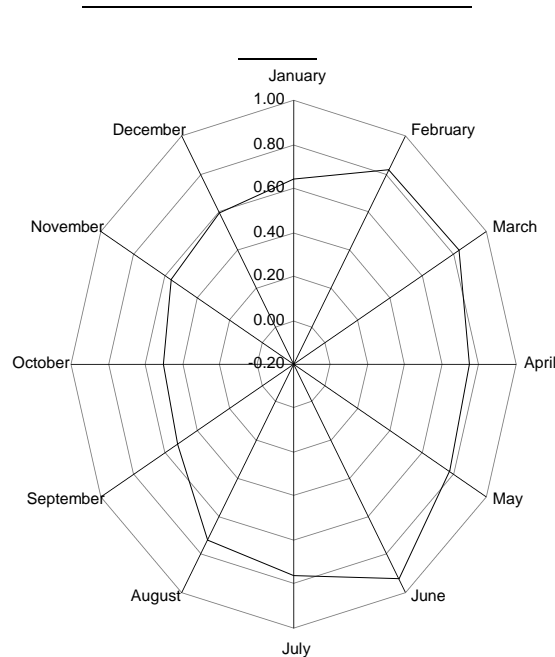


Figure 15 showing grazing cycle of Shompole wetland currently

In addition to occupation of wet areas by farmers, changes in weather patterns, and increase in population, there could be other reasons leading to utilization of the swamp all the time. As shown in the historical timeline, pastoralists who took livestock to the swamp in 1950 lost them to what they called ‘mysterious diseases’. These diseases included Black quarter (*Emburuo*), foot-rot (*Eleleyi*), Heart water (*Oromilo*), and Diarrhea (*Enkorotiki*). It is understood that during this period, the community (pastoralists) relied only on traditional medicine for livestock treatment, which was honed through experience with various diseases in the course of keeping livestock. Therefore,

encounters with new diseases obviously would require a long period to experiment with different concoctions to come up with the right medicine. This may have contributed to keeping away livestock from the swamp since it had diseases they were not used to in other rangeland areas. Conversely, the disease factor now takes lower ranking to availability of grass as a constraint to livestock production because there are different types of conventional drugs that can be used to cure mainly livestock diseases.



Figure (plate) 16 shows burnt swamp in the foreground as a community's adaptive strategy to regenerate grass during extreme try periods

Creation of group ranches may have also impacted on the utilization of the wetland. Respondents note that the group ranch structure reduced the flexibility and mobility of the traditional Maasai system. The community is no longer free to move wherever they want within their sections or even within their subsection where the group ranch boundaries divide Shompole and Olkiramatian. Group ranches have exacerbated the

erosion of traditional authority, including the authority to control grazing resources and use of the swamp, but in general the group ranch committees have not been able to replace the traditional authorities.

This research draws a correlation with the study of the effect of imposing group ranch organization demonstrated in Mbirikani, which was incorporated in 1980 (Peacock *et al*, 1982). Peacock noted that although the traditional neighborhood-based grazing system had been disrupted numerous times in the recent past, for example by the loss of land to Amboseli National Park and the development of new water points, it had adapted and remained essentially intact. After the incorporation of the group ranch in 1980 and when the area was hit by a minor drought in late 1981 and 1982, control over grazing broke down.

4.5.2 Livestock Movement Patterns per Locality

In Shompole Group Ranch, livestock grazing comes at various levels; there is cooperative grazing in which members graze their livestock with less strict order or limitation within the group ranch during good season; reserved grazing areas, *olopololis*, that are *boma* controlled and only livestock from that *boma* grazes there during dry season (as shown in map fig 17); and there is controlled drought period grazing where livestock is taken to the conservation area, which also encompasses the wetland.

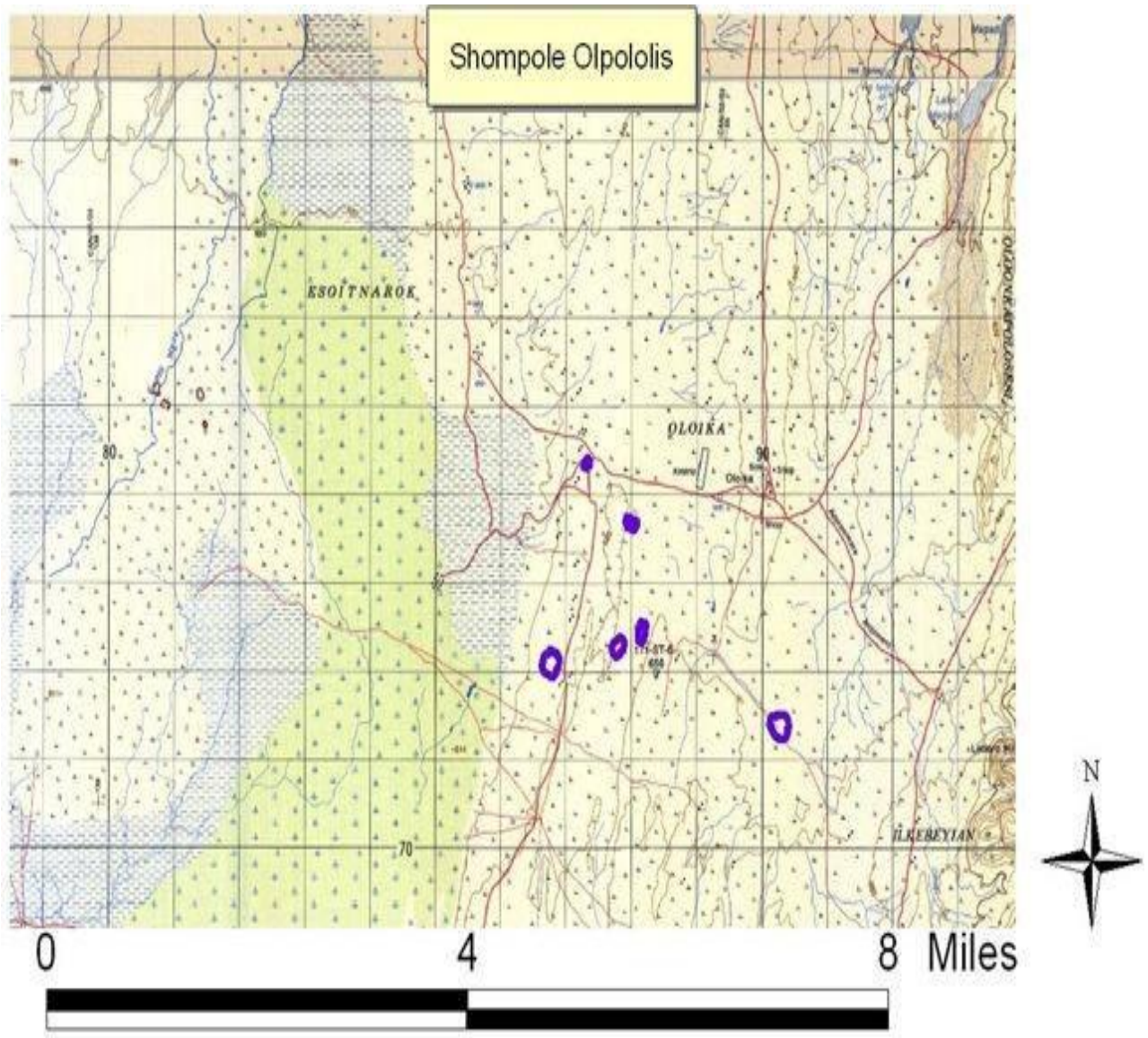


Figure (Map) 17 shows a reserved grazing area (*olopololis*) in Shompole group ranch, dotted in purple. Source: ACC Resource Assessors data

When grazing in the conservation area, groups from each locality OLoika, Lenkobei, Shompole, and Pakase have a different access route and time to the conservation area and the swamp, and their livestock don't mix. Lenkobei locality moves from their settlement by 1st of August and create a temporary settlement at Inkutukie Olangat where they graze up to October towards November; if rains fail they move to Lekungu temporary settlement by November and start grazing in the conservation area after which they move to the swamp by December. They return to their permanent settlement via Inkutukie

Olangat in February if it rains; if it fails to rain they move to Oldonyo Sampuk hills via Pakase where they enter Tanzania. A section of Lenkobei locality sometime will go to Oirri temporary settlement in August then move straight to the swamp in October. Pakase locality starts using the conservation area and the swamp by October, without creating any temporary settlement. They return from the swamp in March. Shompole locality has two sub-settlements namely Endonyo OLasho and Orngwa. Orngwa sub-settlement does not use Shompole swamp but they use Emelil swamp from August to April when they return to their settlement, while Endonyo Olasho sub-settlement uses the Shompole swamp from September and return in March. Oloika locality on the other hand has two sub-settlements namely Orbili and Kawuet and they create a temporary settlement at Esoit Narok in August, before moving to Oloirishi temporary settlement in September from which they graze in the swamp get access to the conservation area by 1st September and to the swamp by December.

These patterns enable different localities to graze in the conservation area and the swamp at varied times to enable it handle the overwhelming livestock in the area. Since Lenkobei and Oloika localities are far from the swamp, they always have specific areas where they create temporary settlements as they move closer to the swamp, and on the periphery of the conservation area in order to access it easily. It should be noted that all settlements and sub-settlements are wet season grazing areas, in which *olopololis* are located. Figure 20 shows these patterns of movement as drawn during focused group discussions. Because the figure is crowded with many other features, an extract of movement patterns, is given in figure 21.

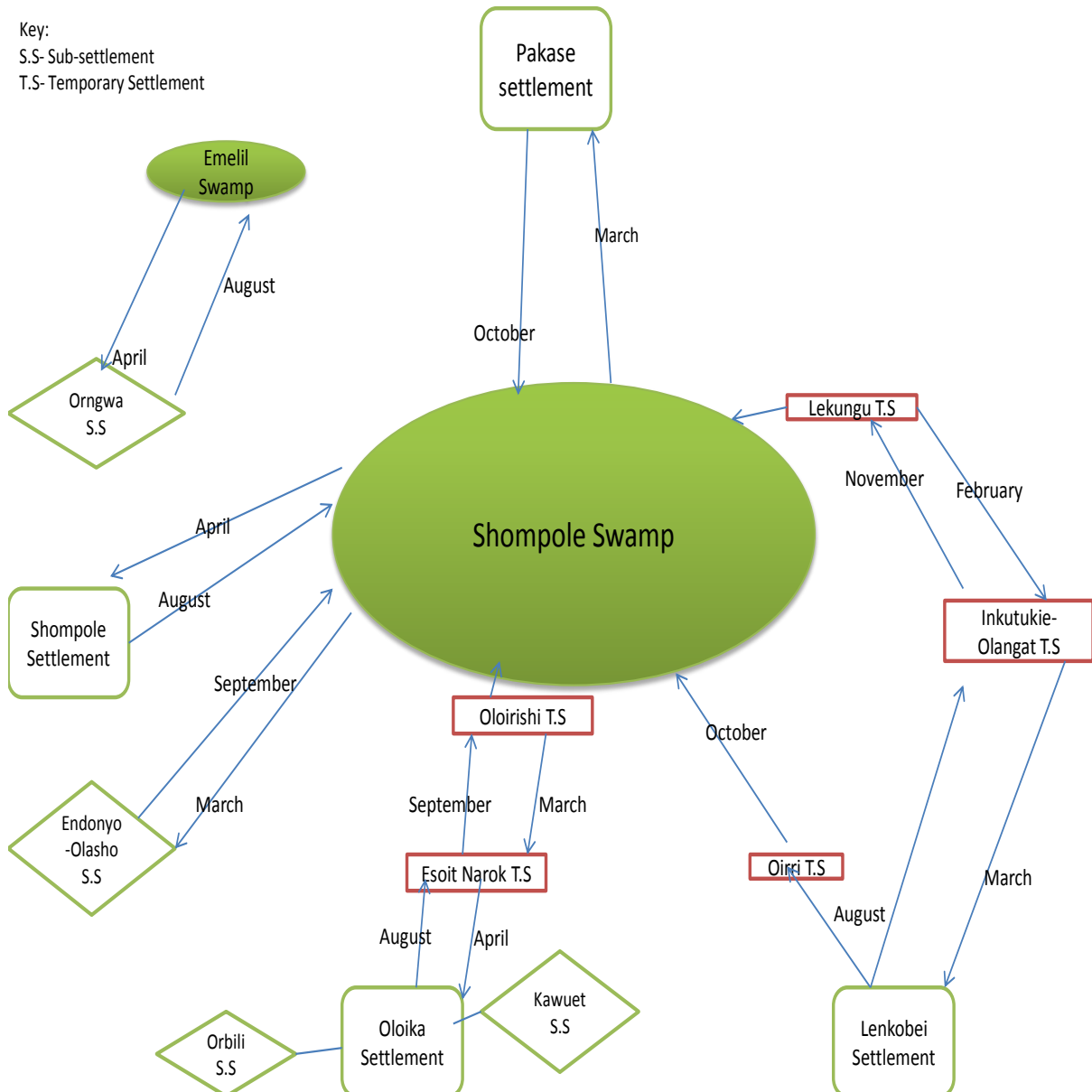


Figure 21 shows extracts of livestock movement from figure 20 above

4.5.3 Disease Avoidance Strategies

As they followed these grazing patterns, they were also keen in avoiding wildlife species that can communicate diseases to their livestock, or themselves. Herders would observe different wildlife species on their route ahead of their cattle and determine whether they are suffering from any disease, communicable to livestock; they would look for visible signs and sometimes behaviour of the animal. Wildlife species that were associated with

communicable diseases included wildebeest, buffalo, giraffe, grant gazelle, zebra, elands, jackal and lion; diseases associated with these wildlife included foot and mouth, anthrax, rinderpest, brucellosis, trypanosomiasis and rabies. Where possible, herders will ensure that their livestock do not graze or water with the affected wildlife, or avoid areas where the affected wildlife was seen. In case livestock is already affected, different measures would be taken to heal or control spread of the disease to other livestock depending on the suspected disease. Table 3 below shows types of diseases, host wildlife, and mitigation or treatment measures pastoralists would take:

Table 3 showing different diseases, their source and mitigation or treatment

Type of Disease	Host wildlife	Communicable to	Mitigation/Treatment
1 Foot & Mouth (<i>Oloirobi</i>)	Buffalo, Wildebeest	Cattle	<ul style="list-style-type: none"> - Avoid the trail host wildlife - Avoid watering same points - Present a piece of the affected animal to traditional medicine - vaccination
2 Anthrax (<i>Entemelua</i>)	Wildebeest, giraffe, grant Gazelle, Zebra	Cattle, Man	<ul style="list-style-type: none"> - Dry up the organ of affected part, crush to powder, mix with water, give young calves - vaccination
3 Rinderpest (<i>Oloodua</i>)	Wildebeest, and Grant Gazelle	Cattle, goats	Dry up the organ of affected part, crush to powder, mix with water, give young calves
4 Brucellosis (<i>Enkeeya Ekule</i>)	Wildebeest, Elands	Cattle, Human beings	Boil the root-bark of <i>Acacia meliferra</i> and <i>nicotica</i> . Administer orally
5 Trypanosomiasis (<i>Entorobo</i>)	Buffalo	Cattle	Avoid the area of affected wildlife, burn the grass
6 Rabies (<i>Enkeeya Ooldiyia</i>)	Jackals & Lions	Dogs, Human beings	Killing all affected dogs

4.5.4 Dynamics in the Management of the Swamp and the Effect of Group Ranch System

Figure 22 shows the way the community responded when asked about the management of the swamp. The respondents were asked who was in charge of the swamp in the past dating back to 1950, now and whom they wished to see take charge in future. In the past, majority of the respondents (59%) said that community elders, more precisely *Olaiguanan* (age set leader), was in charge of the swamp, and other community resources. Now, majority of the respondents (about 55%) said that the group ranch committee, established under the Land (Group Representatives) Act, was in charge of the swamp. The respondents' content that traditional authority is progressively being eroded as elders' councils and tribunals are replaced by government-appointed agencies and functionaries. Yet these functionaries, who qualify for these appointments on the basis of considerations that are totally at variance with what constituted qualifications for leadership in traditional society, cannot effectively replace elders. Their authority does not derive from the traditional system, and they are lacking in the indigenous knowledge that made the elders so appropriate to the task.

Respondents were asked who is in charge of the swamp. Figure 22 uses the response to demonstrate the erosion of the traditional system of resource management with apparent shift to modern state functionaries. When respondents were asked who should be in charge of the swamp, a majority said that they prefer a chief, under the provincial administration, to take charge of the swamp. Progressively, therefore the community has seen management of natural resources by a council of elders under *Olaiguanan*, to democratically elected group ranch committee, and now they desire a chief to take charge of their wetland. Of import is to digress how the two forms of leadership (Group Ranch Committee and provincial administration is arrived at) so as to beef up reasons given during focused group discussions.

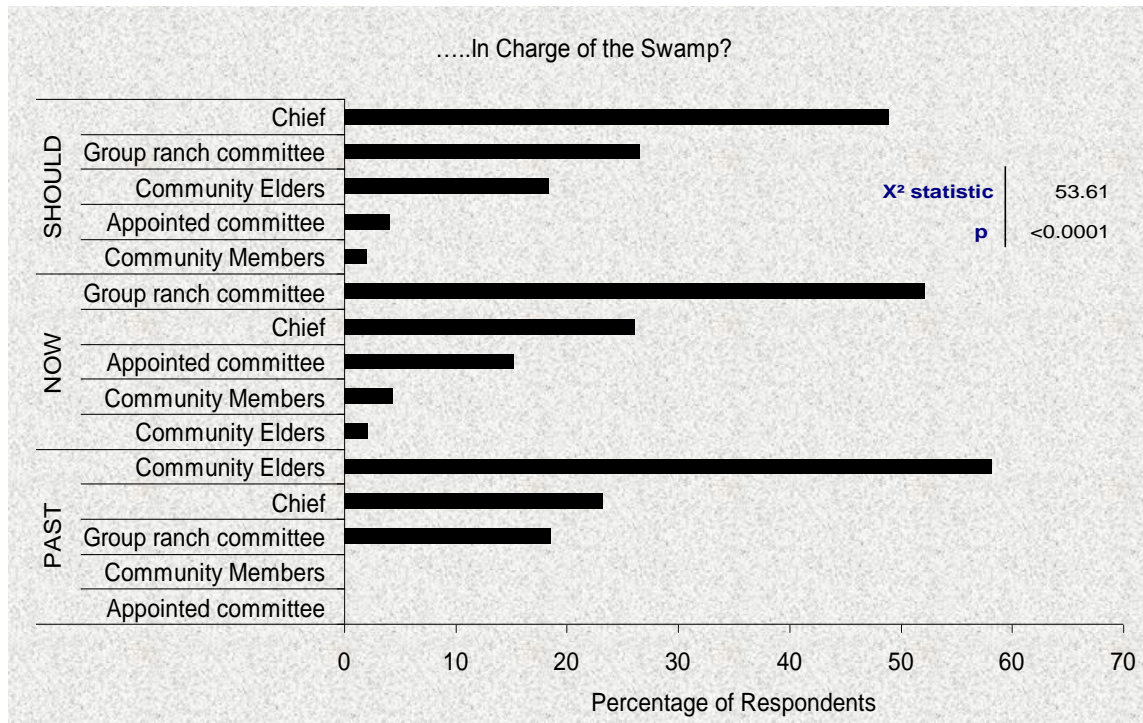


Figure 22 showing progressively changes in the management of the swamp

A chief under the provincial administration is appointed by the government, on the merit of his or her education and serves as a permanent employee. The group ranch committee is elected by members of the group ranch and according to the Land (group Representatives) Act, they are supposed to serve for two years then call for an election. The preference for a chief over a committee was revealed during focused group discussions. Group ranch committee members fear making hard decisions that may aggravate some members, which in turn could mean loss in future committee elections. Respondents contend that the committee hardly calls for meetings to address pressing issues, and when they do, the agenda is often on none-issues. Furthermore, group ranch committee members never take responsibility for their decisions especially if the decision is unpopular, instead they start blaming each other for the decision. Elders, during focused group discussions, said that the group ranch committees were unable to enforce grazing regulations, and in several known instances fines were levied by committees but were not collected.

Bekure *et al* (1991) noted that traditionally, community local affairs were decided by groups or councils of elders on the basis of consensus. Producers who disagreed with the majority were free to go to another *boma*, neighbourhood or locality. In contrast, the group ranch system requires management by democratically elected committees with the authority to impose their will on members, who are permanently tied to the ranch. Effective bureaucratic organization requires the virtual absence of prior ties among individuals, while democratic decision-making can be effective only in the absence of serious factions or when conditions prevent a single faction from dominating. These conditions are not met by the Maasai, with their complex ties and tradition of individual autonomy. As a result, group ranch committees tend not to meet. If they do meet, they deal in non-controversial generalities or, if they address specifics, are unable to reach a conclusion. Even if the committee reached a conclusion it would not be able to enforce it (Dyson-Hudson, 1985).

The formation of group ranches introduced a new level of territorial and administrative organization and a new method of decision making, aimed at radically changing Maasai production and resource management. In practice, however, they have incapacitated traditional leadership in the study area (only 20% of respondents said the council of elders should be in charge as shown in figure 23), without providing a workable substitute (question E4). Respondents noted that the group ranch committee exacerbated the erosion of traditional authority begun in colonial times, including the authority to control grazing resources, but in general the group ranch committees have not been able to replace the traditional authorities.

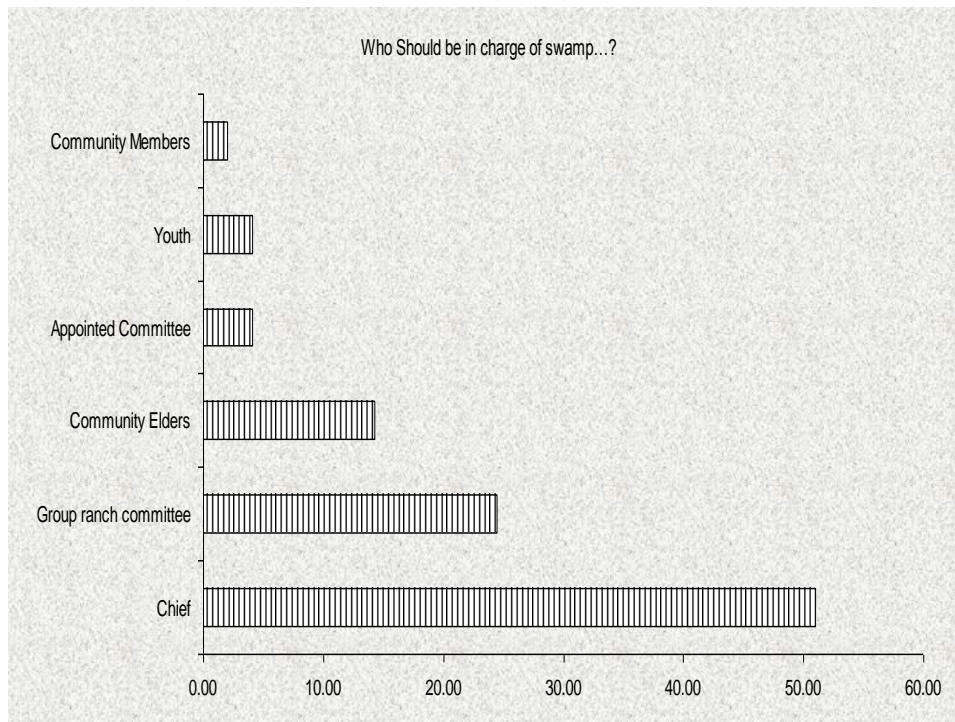


Figure 23. Response to the question of who should be in charge of Shompole wetland

The respondents' preference of a chief therefore is informed by the desire for accountability by leaders, as this has been shown in chiefs. Also, the community is used to traditional *Laiguanan* and they may wish to see their management qualities in the current day chiefs officiated by the Provincial Administration. However, there is an apparent difference between the *Laiguanan* (age set leader) misconstrued as chief by the colonialists to gain advantage on the populace in leadership, and the provincial administration chiefs; while the later is appointed on the basis of academic qualification, the former is said to have been born a leader and experience was a determining factor in reigning authority.

The figure also shows that a significant proportion of respondents (about 30%) said that the chief is in charge of the wetland and also the same percentage said that group ranch committee should be in charge of the swamp in future, maintaining the status quo. In the first instance, the role of the provincial administration is quite ambiguous in the community as they are virtually involved in all aspects of community life. In the study area, there is deliberate attempt for provincial administration chiefs also to wear the hat

of traditional *laiguanan*, who are not recognized by current administrative structures of the government, although the community still reveres them.

The uncertainty and fluidity of the community as to where to bestow leadership has historical derivatives in which independent Kenya took over legal and policy systems established by the colonial government that had no regard to traditional systems of resource management and utilization. Juma *et al* (1995) noted that colonial system created a legislative framework founded on the presumption that the law of the colonial power was superior to the native customs and traditions that governed access and allocation of property and property rights. This created an enduring conflict in natural resource management in Eastern Africa. The conflict was borne out of the simultaneous operation of two different legal systems, one based on Western European perceptions of property and the other based on traditional African perceptions.

In the study community, social systems and cultural norms made the transition from traditional leadership to new forms of leadership strenuous. Ghai (1970) says colonialists sought to impose their systems and institutions on the Africans, and for this purpose created an elaborate legal and policy framework. At the same time they sought, again through policy and law, to extinguish all native forms of resource management institutions and systems. Even where the colonial administration did not interfere with traditional resource management systems, as in certain parts of Tanzania and Uganda, there was, nevertheless, a tacit policy commitment to changing traditional resource tenure to bring it closer to what the colonial administrators were comfortable with.

4.6. Applicability of Common Pool Resource Design Principles on Shompole Swamp

This sub-section seeks to address the objective about opportunities for collective action in managing the Shompole wetland. Several management issues have been looked at in the perspective of Common Pool Resource (CPR) design principles investigated by Ostrom (1990). The sub-section deals with the transformation of the community management of its own natural resources from reliance on community institutions to the concept of ‘co-management’.

It was realized in FGDs that the community linearly exhibited some of the CPR design principles at various stages of transition in resource ownership and utilization, but not all of them at the same time. The study established that Shompole swamp, which is managed as part of the conservation area, does not have some of the design principles, raising the question of the degree to which absent or weakly manifested design principles fail to ensure the effectiveness and long-term viability of the swamp. However, it was realized that with the weakening of traditional systems of resource management, the community moved to embrace ‘co-management’ when it set up a conservation area in 2001, with a diversity of membership ranging from group ranch executives to government institutions and conservation non-state actors.

With respect to the design principles, Shompole swamp management demonstrates both strengths and weaknesses. Its greatest strength lies in the fact that its boundaries and user groups are clearly defined (figure 22). Conflict resolution mechanisms likewise appear to function well within since this is deeply embedded in community age set structures where respect and understanding is accorded to elderliness. Collective choice mechanisms function with moderate success due to the mediation of the democratically elected group ranch committee, and the rights of all adult group ranch members to participate in decision-making processes. The other design principles present shortcomings. While it is a strength that residents perceive a proportional equivalence between benefits and costs, their benefits derived from the wetland are broad but their obligations (costs) to maintain the wetland are few. Design principles are discussed in detail as follows:

4.6.1. Graduated Sanctions

Ostrom (1990) proposes under this principle that appropriators who violate the rules face graduated sanctions. If violators do not face retribution for their transgressions, it will discourage other users from complying. It states that if violators persist in breaking rules, sanctions increase proportionally relative to the severity of their crime.

Shompole swamp CPR exhibited a contradiction to this principle at different stages of its management. The customary legal arrangement of the study community had its own institutional resource management framework that allocates resources, settles disputes when they occur, exacts penalties and inflicts punishment on offenders, and otherwise governs the resource use. It was a framework that is not necessarily within the formal statutory system, and which, in certain instances, is informed by ideals that are contradictory to ideals that are the basis of the formal system. The traditional framework derived its legitimacy not from the policy and legislative actions of the governments, but from the customary norms of traditional society. The sanctions applied within this framework are equally legitimated not by the formal structures of government but by the same customary norms and beliefs. These views are supported by Juma et al (1995).

At the time authority of managing the swamp was under the custodian of the council of elders (periods before 2001), unlike what Ostrom (1990) proposes, appropriators who violated rules were subjected to age-specific punishments, rather than graduated sanctions. FGDs revealed that violators who were about 35 years and below, that's young adults and adults, were subjected to whipping in public while elderly members were subjected to a community curse. Whipping was meant to shame the violators so that they are deterred from the offense while cursing of elderly violators was aimed at incurring on them a personal cost of either losing the best cattle one loved, or losing a family member. The rationale for this was that the community took greater offense to elderly violators as they acted as wrong models to the young generations and their violation of community norms and rules would be transmitted to young generations. Respondents said that humiliation of young adults in public was deemed to be more deterring and exhibiting the authority of the council of elders on them. Another dimension that was brought out during focused group discussions to this system of punishing violators was related to

resources and taboos: it was understood that young adults had not accumulated wealth/cattle of their own as most of them could be still dependent on their parents herds, and could not be having family, while it was a taboo to humiliate an elderly person in public, especially by a council of elders to whose members they belonged in the same age group. The table below shows variances in the way the community sanctions offenders from the way Ostrom (1990) stated in the design principles.

Table 4 shows the differences in the way the community sanctions offenders from what Ostrom (1990) stated in the CPR design principles.

Graduated Sanctions principle		
Design features per Ostrom (1990)		Shompole community features
1	Graduated sanctions	Non-graduated sanctions
2	Sanctions not differentiated by age or sex	Age-specific sanctions
3	Sanctions are monetary-based/material	Sanctions are none material, curse-based
4	Sanctions meant to deter due to material loss	Sanctions meant to shame and demean one's social status

This form of sanctions to violators was deemed successful for quite a long time until the dynamics in the community started changing. Discussions noted that with the spread of Christianity and other world religions, fewer community members believed in taboos and other cultural norms hence making it difficult to enforce a form of punishment which was exercised through invoking a curse, one would lose loved cattle or a member of the family. It was also reported that formal education also contributed to community members doubting the efficacy of curses. With the eroding of powers of the council of

elders and the creation of two centres of authority through the provincial administration and group ranch committee, there was significant lack of direction as to how the swamp should be managed, leading to intervention from outside through the creation of a conservation area that encompassed the swamp. It should be noted that the conservation area was created to boost tourism in the area, and the swamp benefited as a result. Shompole Conservation Trust agreed on a non-graduated sanction system, where those who use the swamp against the required time would pay a fine of Ksh.10, 000.00. This is regardless of the amount or type of cattle taken there, or the frequency of taking them there.

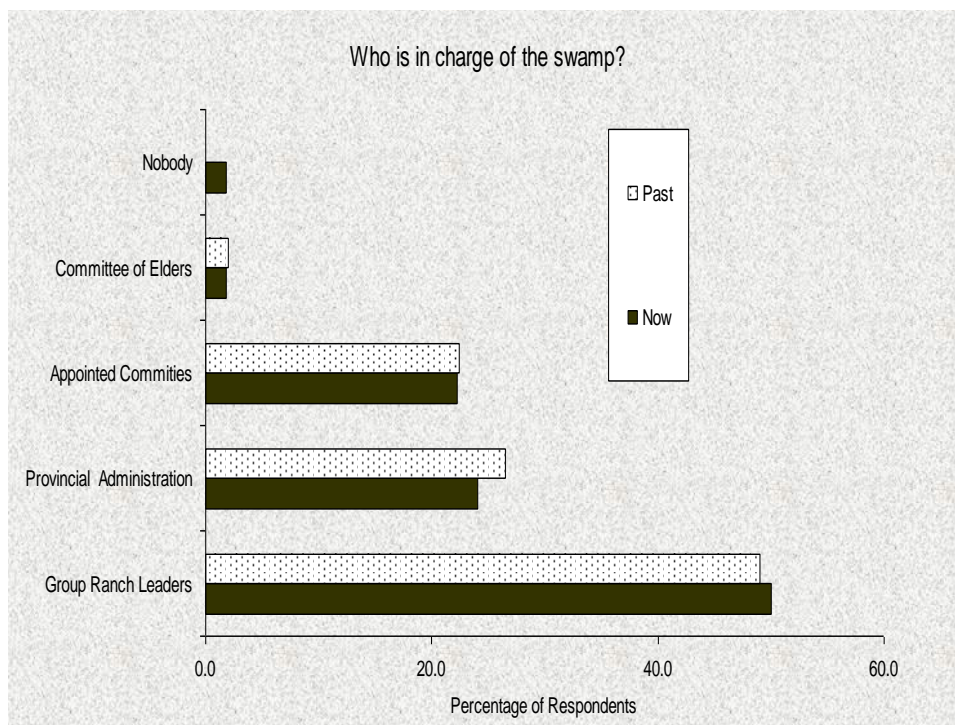


Figure 24 showing respondents perception of who is in charge of the swamp

4.6.2. Clearly Defined Boundaries

This principle states that conditions must hold for users and outsiders to recognize legitimate group members, the area to which users have rights, and the perimeter that users protect incursions; otherwise the resource exists as a *de facto* open access (Ostrom 1990). The boundaries of Shompole Group were surveyed and clearly marked in 1972 with border markers such as visible landmarks, which residents check periodically to prevent incursions by neighboring group ranches. Recently, when an investor wanted to

put up a lodge along the Ewaso Ngiro River, the area had to be re-surveyed to establish clearly whether the site was within Shompole or Olkiramatian group ranch. These boundaries were established through the Land (Group Representatives) Act in 1972.

Further, land titles that were granted by the national government define borders, though Shompole still has an allotment letter; it has not followed up to acquire a title deed. Further within the group ranch, the designated conservation area that encompasses the wetland is clearly surveyed, and marked with landmarks such as trees, but not beacons; since the formation of the conservation area was a consultative process involving other stakeholders, the community could not tolerate beaconing of the conservation area boundaries as they perceived this as amounting to selling land. The conservation area is also communally used as a grass bank during dry periods and the usage of the conservation area is integrated with that of the wetland.

Rights to use Shompole communal resources, and to obtain land use rights, belong solely to members of Shompole group ranch who achieve their status by birth as stipulated under the land (Group Representatives) Act. However, although the Maasai do not regard fish highly, the presence of the resource has attracted other groups that consume fish. This, together with other factors, has led to the in-migration of riparian communities in the area, who live at market centers especially Shompole. They fish for free and use it for domestic consumption and also for commercial purposes.

4.6.3. Collective Choice Arrangements

Ostrom (1990) stated that when most resource users have the opportunity to contribute to the creation and evolution of rules that define their rights and responsibilities, they are more likely to find arrangements that are mutually acceptable and adaptable to changes. Every resident of Shompole Group Ranch has the right to participate in decision-making processes to confirm or transform the principles for managing the communal conservation area. Every resident may express an opinion. When a topic is controversial, the discussions may last for hours, and continue through several successive sessions. The population participates in meetings sporadically; most individuals attend only when a

matter of personal concern is to be addressed or when an issue of great public interest is to be debated. Traditionally, men dominate decision-making processes though women and children are also key participants.

4.6.4. Monitoring

In this principle Ostrom (1990) holds that even when rules fit the local circumstances, and users participate in decision-making processes, the temptation to free-ride exists. Monitoring increases the likelihood that free-riders will be observed, and can therefore be held accountable. In long-enduring CPR, the monitors tend to be appropriators, or are accountable to them. In the case of Shompole, this principle will be looked at historically. Focused group discussions noted that in the past, there was no monitoring over the use of the swamp for several reasons: nobody could contemplate going against the decision of elders once it's resolved when the swamp should be used; there were sufficient grazing areas and the swamp was a last resort during extreme dry periods. Ostrom (1990) agrees with the view that when the resource exists in plenty monitoring is hardly realized or instituted. When respondents were asked about the existence the existence of monitoring in the past, only 10% said there was, as shown in figure 25.

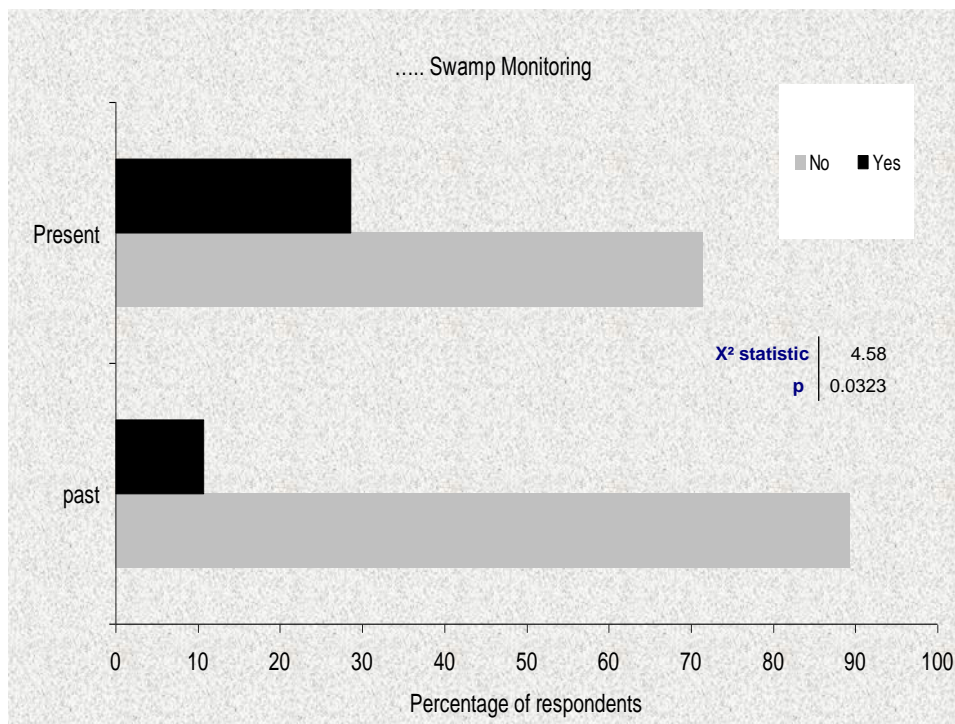


Figure 25 shows responses as to whether the swamp was monitored in the past, and whether is being monitored now

Gradually as the population increased, the authority of elders declined and scarcity of grazing areas set in, it became necessary to adopt new strategies. At the formation of the conservation area, it was decided that there would be game scouts who would monitor and enforce the use of the conservation area, which encompasses the swamp. At this level, the procedure of selecting game scouts agrees with the requirements of monitors as per Ostrom (1990). The game scouts are employed by and are accountable to Shompole Conservation Trust and are paid by revenue collected from the conservation area fee (this fee is charged on guests who visit the lodges located within the conservation area), and they are also members of the community.

However, it's noted in figure 25 that respondents had poor knowledge of monitoring despite there being formally community-recognized game scouts; only 30% recognized that there are people employed to monitor the use of the swamp then. This is because the game scouts roles are not limited to the swamp but to the whole conservation area, which serves many purposes; chief among their roles is to protect wildlife (central attraction of tourism), monitoring grazing is a secondary role. It was noted that game scouts have

concentrated more on keeping security at the lodges and also working as tourist guides than in securing the whole conservation area, though there are game scouts-manned gates to the conservation area to collect fees and restrict entry by tourists who might not have paid. Further, the community recognizes the role of game scouts as being more in securing them and their resources from harmful wildlife than in regulating their use of the conservation area.

4.6.5. Conflict Resolution Mechanisms

In this principle Ostrom (1990) recognizes that even when users design and modify rules jointly; individuals may differ in their interpretation. These differences can occur honestly or as a reflection of efforts to dodge obligations. Low cost, readily accessible arenas for addressing conflicts allow users to reach resolutions before disagreements threaten the system. In the case of Shompole wetland, conflict resolution mechanisms exist. Parties to a conflict over grazing and acquisition of other services from the swamp generally aired their tensions publicly and often attempts were made to solve them at *boma* level if it was within members of the family or at locality level if it was between members of different *bomas*. However, if the disagreement was between localities, for example Oloika and Pakase, then it would be solved at group ranch level. There were limited conflicts at *boma* and locality level because they grazed as a unit; there were conflicts at the locality level especially regarding the timing of taking livestock to the swamp. If the parties did not reach a resolution through personal confrontation and pressure applied through social networks, then a council of elders meeting would be called to arbitrate.

Usually, the community is knowledgeable of the dispute prior to the meeting, due to extensive and ingenious ways of communicating (maybe gossip) within the pastoral community. The committee requests a detailed explanation from the interested parties and their supporters. In resolving the conflict, the committee provides an explanation based upon community norms, taboos and principles, precedents from previous cases, and where necessary though in limited application laws of the government. The effort at

impartiality provides protection for the council. The losing parties generally accept the outcome even though they may harbor resentment.

4.6.6. Congruence of Rules with Local Conditions

This principle holds that appropriators are more likely to comply with obligations and abide by constraints if the rules reflect their circumstances and lie within their means. When the applicability of this principle was tested on Shompole wetland, respondents were asked if rules for the use of the swamp changed according to prevailing conditions in the past while congruence of rules with conditions now was tested through focused group discussions. Respondents were asked whether rules were changed according to prevailing conditions. Respondents were clearly in disagreement as to whether rules in the past changed according to prevailing conditions, with 49% saying yes while 51% said no as shown in figure 26. This may mean that the question was not clear to the respondents.

Were rules changed according to prevailing conditions?

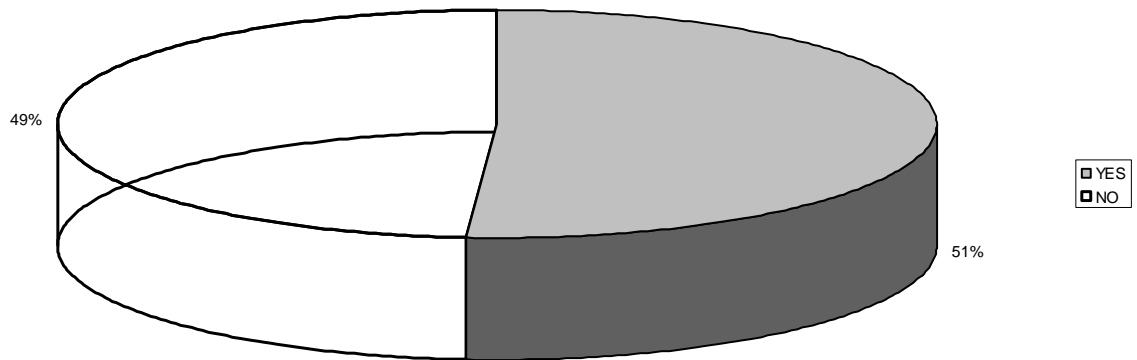


Figure 26 showing responses on the congruence of rules with local conditions

To understand this response, it is important to appreciate the revelations made during focused group discussions on how the council of elders worked. To qualify as a member of the council of elders, one had to have outstanding a character among his age-set and maintain high integrity throughout one's life. Experience in the affairs of the community, especially in livestock and grazing management was a critical qualification. The council of elders weighed its decisions carefully considering experiences in the past and the interest of the community. However, this variance in responses is founded in the fact that though decisions were announced in community meetings, they could not be challenged. Furthermore, calling for the meetings to make such decisions/announcements was the elders' prerogative and they could make such a move depending on their observation of prevailing conditions, not on other people view of what was happening. Therefore while there was a rigid process in the way elders made decisions, often they revised them to suit

the prevailing conditions. Some respondents could therefore have considered the process, rather than the decisions of elders in sighting lack of congruence with local prevailing conditions. This discussion was further augmented in the historical timeline drawn above, showing how the community changed strategies regarding grazing to suit the prevailing weather conditions.

Presently, decisions on the use of the swamp are made and revised all the time by the Conservation Area Trust. Although its structurally agreed that livestock should be in the swamp for a maximum of three months a year, in the last three years they have been there almost all the time (as shown in figure 15) due to the frequent and prolonged droughts that were not anticipated when the rules were being drawn up. For the whole of the year when field work was being undertaken for this research, livestock left the swamp to Olodonyo Sampu Hills in Tanzania when it was completely decimated, rather than when time was due to move out.

Further, congruence of rules with local prevailing conditions was exhibited when the decision to put up a temporary *boma* on the periphery of the conservation area for Lenkobei locality was made. At the setting up of the conservation area, there was an agreed settlement area (for four localities namely Shompole, Oloika, Pakase, and Lenkobei) and conservation area. However, when it became difficult for Lenkobei locality to access the conservation areas to the long distance, rules were revised to allow Lenkobei locality to set up a temporary *boma* (Lenkung Temporary settlement) on the periphery of the conservation area.

4.6.7. Nested Enterprises

Ostrom (1990) proposed that for larger CPR systems, design principles are organized into multiple layers of nested enterprises. The term ‘nested enterprises’ refers to interrelated (sometime hierarchical) organizational components that take on complementary sets of responsibilities and they vary to suit the nature of the CPR and its context. Shompole wetland is too small a resource to warrant the nested enterprises principle. However, the structure of the Shompole Conservation Trust (SCT) which manages the conservation

area within the group ranch mimics nested enterprises as pointed out by Ostrom (1990). Shompole Group Ranch is under the management of Shompole Group Ranch Executive Committee which established Shompole Conservation Area under the management of SCT whose members include group ranch executive, lodges' representatives, 5 sub location representatives and co-opted members like Kenya Wildlife Service (KWS), African Conservation Centre, Magadi Soda Company, tourist lodges, and experts like David Western who is an ecologist/conservationist).

The Conservation Trust that is tasked with managing the use of the conservation area has a membership that transcends the community and at the same time it is not strictly answerable to or reports to the group ranch executive committee, which has the overall mandate on the group ranch as per the Land (Group Representatives) Act. Game scouts, who play a critical role of monitoring, are answerable to the conservation trust. Significantly, though, by allowing diversity and co-opting non-community members to the trust, the community transposed the structure of their institutions in recognising their inadequacy in self management, by embracing co-management. In effect, this structure of the conservation trust changes the dynamics of collective action institutions as proposed by Ostrom (1990). The meaning of 'community' also changes to mean a group of people working towards a common goal. The diversity of membership to the conservation trust is meant to compliment the community where it lacks necessary resources to achieve the objective of setting the conservation area that included acting as a grass bank during the dry season, an ecotourism investment hub that enables the community to diversify its income, and to secure wildlife resources. All these community interests are secured through diverse representation in the conservation trust.

This strategy is consistent with Tyler (2006) where he says 'co-management' arrangements will vary with the nature of the resource, the political context, the expertise and skills of participating organizations, and the degree of mutual trust. The focused group discussions noted that external technical expertise provided by Dr David Western, who has pioneered conservation research and poverty eradication programs in the area provides practical alternatives which serve to validate local knowledge, inform local

action, and facilitate locally led initiatives as witnessed in setting up the conservation area and income generating initiatives such as lodges established there.

‘Co-management’ still also needs to undergo transformation, according to the perception given by respondents on efficacy in utilization of the swamp (Figure 27).

Efficient swamp utilization

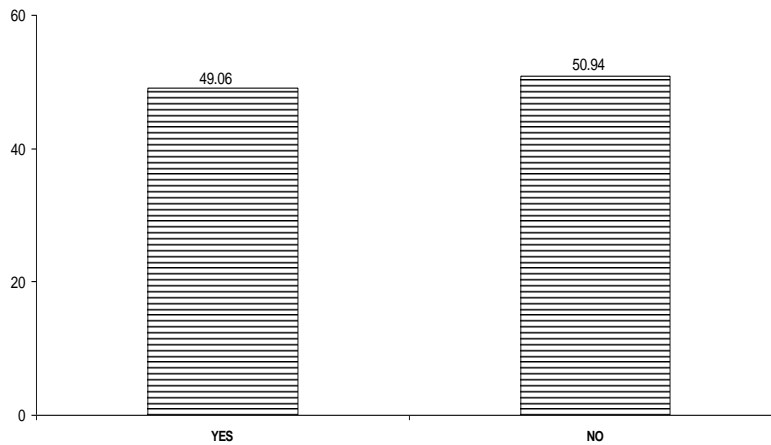


Figure 27. Responses by percentage as to whether the swamp is well utilised or not

Compounding the wetland management dilemma is the community’s perception as to whether the wetland is well managed or not. When respondents were asked if the wetland is efficiently utilized, 49.6% said yes while 50.4% said no, the difference in respondents’ opinion is not significant, posing challenge as to how changes can be made in the efficiency over the use of the swamp. However, several factors can be considered in understanding these responses in terms of efficient management and also in procuring services from the wetland. In the first instance, while the majority of respondents prefer that a *Laiguanan* takes charge of managing the wetland, quite a significant number (30%) stills holds on the group ranch committee. However, this is solved when the community embraces ‘comanagement’ as discussed above under this design principle. In the second instance, efficiency in procurement of services comes at several levels; traditional uses of

the swamp and its emerging role in diversification of community livelihoods through tourism.

During focused group discussions, members said that while livestock grazing constitutes the hallmark of swamp utilization, there are other resources which could complement their income though they are not regarded as a resource. For example fishing in the swamp is free of charge yet there is a huge market for fish outside the community and this could significantly contribute to their income. This is so because the community continues to relate with each other and with their natural resource base on the basis of customary laws and norms hence they do not eat fish, nor is there any knowledge of fishing in the community. Access to natural resources in the study community is governed by customary rules applied by traditional institutions, which are fading fast.

During focused group discussions, it was revealed that efficacy of communal use of resources is being limited by urbanization and formal education. Urbanization results in the migration of large numbers of people from the rural areas to the urban centres. Most of these are young people in search of better opportunities. Once they move in to towns they come under the influence of diverse cultures. The traditional structures of authority no longer apply to them, and even when they return to the country-side whether on visits or permanently, they do not ascribe to the authority of the elders. They begin to question some of the tenets of traditional Maasai community including, those that govern property relations.

Another important factor that was mentioned as being a hindrance to the application of community norms and values in wetland management and natural resource management generally was formal education. It was noted that views of members of focus groups were at variance with results of questionnaire survey when a comparison of views on efficacy of swamp utilization was made to education levels of respondents. In FGD, formal education was said to change value systems of individuals hence putting them at variance with other members of the community who did not go to school. In this regard, question A6 which asked level of education of respondents was correlated to question E1 which required the respondents to say whether respondents are satisfied with the efficiency in which in the swamp is used. In this questionnaire survey, the results according to figure

28 below show that there is no significant variation in the way educated members of the community responded to efficacy in the use of the swamp from the way none-educated members responded. Although most of the respondents are recorded to have had no formal education by a factor of 80%, the few that had formal education were equally divided in affirming and denying efficient utilization of the swamp.

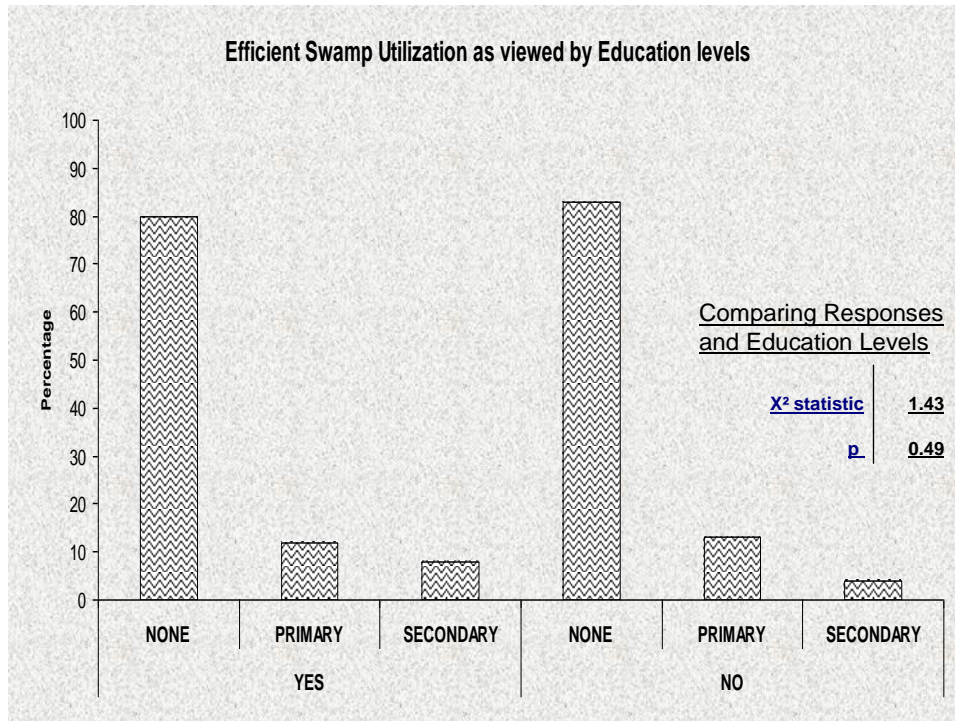


Figure 28 shows comparison of responses to efficacy in swamp utilization by education levels of respondents

4.7. Synthesis of Discussion

From the results and discussions above, it was revealed that the study community depends on pastoralism as its main source of livelihood. Neighborhoods and *bomas* are breaking down as individual producers spread out across the landscape, establishing individual *bomas* and often establishing their own individual calf pastures. Patterns of cooperation among Maasai seem to be changing. For example, the declining size of the *boma* seems to be in response to the need for less cooperation in animal production and communal resource utilization. Respondents claimed that livestock numbers have

declined drastically and thus there is less need for cooperative herding; due to fewer cattle, there less need for cooperation.

The discussions revealed that with many people opting for Christianity that prohibits multiple partners rather than traditional forms of religion that encouraged and tolerated polygamy, members of the study community are having fewer spouses. Education and modernization of the younger generation in the study area has changed their values and norms regarding marriage enabling them to embrace monogamy. The decline in the number of livestock, interpreted as the decline in wealth of the community is also cited as a major cause in the declining number of spouses men are marrying; increase in livestock numbers precedes the desire to marry many wives. There was also a significant relationship in the study area between the number of livestock one had and the number of wives one had.

It was realised that the community applied different strategies for using and managing the swamp depending on the prevailing conditions in limitation to the capacities of community institutions. It was understood from the focused group discussions that the community did not particularly like using the swamp, unless they were under duress from drought; even so, they would avoid some sections and graze interchangeably with dry grasslands. Unlike the collective use of the swamp, the river draining into the swamp was used and managed as private property, limited to *boma* or *enkutoto*; subdivisions were made along the river as to where a *boma* would water their cattle.

As the human population increased, there was need to increase the production and subsistence base, which was mainly livestock, to meet the demands of the increasing human population. The need to increase livestock production coincided with the occupation of wet areas (Nguruman escarpment) by farmers that were dry period grazing zones. At this point, respondents say the community started looking at the swamp as a key grazing area option during dry periods. Augmenting the swamp are reserved grazing areas strategically located in the group ranch, some located along the Ewaso Ngiro River. Dry grazing areas, *olopololis*, are boma owned and the boma controls its use. As population increased unevenly due to varied sizes of localities that included Oloika, Shompole, Lenkobei and Pakase, there increases demand for grazing areas hence

accentuating imbalances in grazing areas availability, inducing pressure on the wetland. As the number of parties competing for grazing in the swamp increased (at the family/*boma* and community levels) and possibilities for migrating with livestock became scarce due to the creation of group ranches in the area, every possible strategy was employed to increase the strained capacity of the wetland to sustain grazing during the dry periods

The creation of group ranches may have impacted on the utilization of the wetland. Respondents note that the group ranch structure reduced the flexibility and mobility of the traditional Maasai system. The community is no longer free to move wherever they want within their sections or even within their subsection where the group ranch boundaries divide Shompole and Olkiramatian. Group ranches have exacerbated the erosion of traditional authority, including the authority to control grazing resources and use of the swamp, but in general the group ranch committees have not been able to replace the traditional authorities.

The respondents' content that traditional authority is progressively being eroded as elders' councils and tribunals are replaced by government-appointed agencies and functionaries. Yet these functionaries, who qualify for these appointments on the basis of considerations that are totally at variance with what constituted qualifications for leadership in traditional society, cannot effectively replace elders. Their authority does not derive from the traditional system, and they are lacking in the indigenous knowledge that made the elders so appropriate to the task. The formation of group ranches introduced a new level of territorial and administrative organization and a new method of decision making, aimed at radically changing Maasai production and resource management. In practice, however, they have incapacitated traditional leadership in the study area (only 20% of respondents said council of elders should be in charge as shown in figure 24), without providing a workable substitute. Respondents noted that the group ranch committee exacerbated the erosion of traditional authority begun in colonial times, including the authority to control grazing resources, but in general the group ranch committees have not been able to replace the traditional authorities.

It was realized during FGDs that the community linearly exhibited CPR design principles as investigated by Ostrom (1990) at various stages of transition in resource ownership and utilization, but not all of them at the same time. During the study period, it was established Shompole swamp, which is managed as part of the conservation area, lacks some of the design principle, raising the question of the degree to which an absent or weakly manifested design principles undermines the effectiveness and long-term viability of the swamp. However, it was realized that with the weakening of traditional systems of resource management, the community moved to embrace 'co-management' when it set up a conservation area in 2001, with a diversity of membership ranging from group ranch executives to government institutions and conservation non-state actors.

CHAPTER 5

5. Conclusions and Recommendations

5.1. Introduction

This chapter summarises intentions of the research and concludes discussions arising from the results of the research. It further recommends appropriate measures to be taken in light of the conclusion.

5.2. Conclusions

This study has looked at the challenges to and opportunities for collective action in managing common pool resources, in the Shompole wetland. The objectives of the study were to: Identify resources of the wetland to the community and its environs and the changes that have occurred in their use; Investigate community rights, regulatory procedures, values and norms pertinent to the use of the wetland resources; investigate challenges that hinder sustainable use of the wetland; and Identify opportunities for sustainable use of the wetland. Qualitative and quantitative methods of studying were used in study and they yielded a diversity of data that enabled analysis of socio-spatial characteristics of the study community, historical perspectives on the use of the swamp, demographic challenges in the use of the swamp, dynamics in the management of the swamp, ecosystem services offered by the wetland to the study community, and applicability of common pool design principles in the management of the wetland.

The data on socio-spatial integration of the study community indicated that the average size of the *boma* had declined markedly and the single family *boma* had become increasingly common as the study population (Maasai) became increasingly sedentary and moved towards individualization of production. The *boma* was traditionally the unit of cooperation in herding, and the decline in *boma* size has important implications for herding. There could be other factors contributing to the decline in the size of the *boma* other than change in the production system from communal to individual. Fewer wives, fewer children, urbanization and less cattle; might be the dimension of the change. Inversely, there might be no change in *boma* sizes, but rather, resultant effects of group ranch system, having less cattle, sedentarization, and loss of mobility. Nevertheless, this

apparent decline in cooperation has coincided with an increase in the proportion of children attending school, leading to labour shortages and the use of women and increasingly hired labour for herding. As they become more sedentary, the Maasai have tended to develop and maintain few, close ties; the importance of widely dispersed social ties, especially those of clanship and age-set, is apparently declining. Intriguingly, all single *bomas* spotted during the transect walk were said to be owned by members who had acquired wealth through other means other than from livestock. It was also said that members who had formal education and were working away tended to live singly. This is to say that acquisition of wealth and diversification of livelihoods through employment and trading is leading the community into individualization. To address communal resource in the community, therefore, strategies should focus on households who in-turn form decision-making caucuses in the group ranch.

In investigating the impact of group ranch system, respondents revealed that the formation of group ranches introduced a new level of territorial and administrative organization and a new method of decision making, aimed at radically changing Maasai production and resource management. In practice, however, they have incapacitated traditional leadership in the study area, without providing a workable substitute. Respondents noted that group ranch committees exacerbated the erosion of traditional authority begun in colonial times, including the authority to control grazing resources, but in general the group ranch committees have not been able to replace the traditional authorities.

Historical perspectives on the use of the swamp revealed that while the swamp was hardly used prior to 1970s, its usage by most of the study population increased from the year 1973 in which almost three months of the year were spent grazing in the swamp as a result of dry season areas being taken away by crop farming. As shown in the discussion on grazing cycles, presently virtually the whole year is spent in grazing livestock in the swamp. Due to frequent droughts, the community has resorted to burning dry vegetation so that it can re-generate to feed on their livestock; this is affecting wildlife and the general ecology of the swamp (figure 16).

An analysis of livestock grazing patterns per locality in the study area established that livestock grazing comes at various levels; (1) there is declining cooperative grazing in which members graze their livestock albeit with less limitation within the group ranch during good seasons; (2) reserved grazing areas, *olopololis*, that are *boma* controlled and only livestock from that *boma* graze there during dry season (as shown map 2); and (3) controlled drought period grazing where livestock is taken to the conservation area, which also encompasses the wetland.

It was further established that the four localities in Shompole Group Ranch use the swamp at different times of the year, and they have different movement patterns, following an agreed upon schedule though there are deviations by some members. From these patterns, it is concluded that the swamp plays a critical role hence sustaining pastoralism during extreme duress periods, the choice of pastoralism as a major livelihood option enhances the desire to use it sustainable manner.

5.3. Recommendations

The results of the study lead to the following recommendations:

1. Develop a monitoring strategy to map out grazing system and movement of livestock in the swamp
2. A national wetlands policy that is being developed should have a focus on fostering co-management of wetlands that are communally owned to enhance their output to the community and sustainability
3. For purposes of further understanding, a study should be carried out to document indigenous ecological knowledge applied by the pastoral community in mitigating against communicable diseases from wildlife as they shared common resources such as grazing and water points.

4. A study be carried out to highlight ecological changes in Shompole swamp as a result of changes in the frequency of livestock grazing in the swamp and survival measures such as burning hardy grasses to foster regeneration

5. There should be an all stakeholders collaborative initiative to support traditional grazing patterns that have made pastoralism suitable in rangelands, since group ranch system have undermined traditional grazing patterns.

Glossary of Maasai Terminologies

Emparnat	Permanent <i>boma</i>
Ronjo	Temporary <i>boma</i>
Oloirishi	Swamp
Esiriti/emorata	Age group
Olojaiji/olopina	Age set
Ininchoyie	livelihood
Emboot	Drought
Olameyiu	Dry season
Emburuo	Black quarter disease
Oloirobi	Foot and Mouth disease
Entorobo	Trypanosomiasis disease
Eleleyi	foot-rot disease
Olondua	Rinderpest disease
Entemelua	Anthrax
Oloibon	Ritual expert/prophet/medicine man
Olopololis	Reserved grazing area
Olaiguanan	Age Set leader
Enkeeya Ekule	Brucellosis
Enkeeya Oolchiyin	Rabies
Oloirishi	the middle of two river
Lekungu	thicket of acacia tortilis and others, where you only crawl on knees
Olmarei	family
Olgilata	clan

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Appendices

Questionnaire

Dear Respondent,

I'm a master's student carrying out Action Driven Research with the aim of developing a thesis report. This questionnaire is therefore is meant to get your objective opinion for the above purposes.

MODULE 0: IDENTIFICATION OF RESPONDENT'S LOCATION /QUALITY CONTROL

DISTRICT		INTERVIEWER	
DIVISION		INTERVIEW DATE	
LOCATION		TIME STARTED	
SUBLOCATION		TIME ENDED	
VILLAGE			
TOWN/TOWNSHIP			
NAME OF GROUP RANCH			
PLACE OF INTERVIEW			
GIS COORDINATES OF HOUSEHOLD	X:	Y:	

MODULE 1:

MODULE 1: GENERAL HOUSEHOLD INFORMATION							
No.	Question	Codes/Answers					
A1	Name of household head:						
A2	Marital status of household head:	1=Married	2=Single	3=Divorced	4=Widowed		
A3	Number of spouses:						
A4	Age of household head:	1=Elderly (above 55 yrs)	2= Medium age (30-55)				
		3= Young adult (18-30)	4= Child (15-18)				
A5	Name of Age-Group of Household head:						
A6	Education of household head:	1= None	2= Primary	3= Secondary	4= Tertiary		
A7	Number of households in boma:						
A8	How long have you lived in this boma? (Years)						
A9	Is the boma permanent or temporary? If temporary, in which season does the household live in this boma?	1=Permanent		2=Temporary			
		Season:					
A10	Form of land tenure	1= Individual(<i>give acreage</i>) 2= Group Ranch					
A11	Education of Household members: (<i>indicate how many in each category</i>)	None	Primary	Secondary	Tertiary		
A12	Major household livelihood classification (Mention the major three, in order of importance)	<i>Codes</i> 1=Pastoralism 2=Crop farmer 3=Fisherman 4=Fishing 5=Livestock Trader 6=Livestock Driver (Emporokuai) 7=Employed Herder 8=Charcoal/firewood 9=Handicrafts (e.g. making mats, beadwork) 10=Sale of mineral salt 11=Herbalist 12=Salaried employee (e.g. teacher, policeman) 13=Wage labourer e.g. mechanic, watchman 14=Other sources (please specify)				RANK	
A13	Where are the household members employed?	Where employed			Male	Female	Total
		Within same Group Ranch					
		In another Group Ranch					
		In Magadi Soda Company					
		In other districts or towns in the country					

MODULE 1: GENERAL HOUSEHOLD INFORMATION					
No.	Question	Codes/Answers			
		Other (Please specify)			
A16	In which sectors are these persons employed?	Codes		M	F
		1=Livestock sector			
		2=Agriculture			
		3=Tourism e.g. hotels & lodges			
		4=Conservation e.g. wildlife			
		5=Civil service			
		6=NGO/CBO			
		7=Private sector			
		8=Other (Please specify)			
A17	Is household head in a position of leadership in the Group Ranch or in the community generally? If so, state the position(s) and responsibility	LEADERSHIP POSITION(S)		RESPONSIBILITY	
A18	Is any other household member in a position of leadership in the Group Ranch or in the community generally? If so, state the position(s) and responsibility	GENDER OF MEMBER (M, F, YOUTH)	LEADERSHIP POSITION(S)	RESPONSIBILITY	
A19	Is any member of the household a member of an association or other community organization? If yes, indicate the gender of the member and the group/association of which they are members	NAME OF GROUP, ASSOCIATION, etc.	NUMBER OF MEMBERS BY GENDER		
			M	F	YOUTH
		1			
		2			
		3			

MODULE 2

MODULE 2: Pastoralism and wildlife						
B1	What numbers of different livestock types did the household have before and after the drought of 2005, and now?	Livestock type	Before 2005 drought	Now		
		Cattle				
		Camels				
		Goats				
		Sheep				
		Donkeys				
B2	Livestock numbers now	Cattle:	camels:	Sheep:	Goats:	Donkey:
B3	How many animals were sold, or died between 2007 and 2008 and what were the causes of death?					
	Livestock type	Cause of death	females	males	No. Sold:	
	Cattle				Females:	
					Males:	
	Camels				Females:	
					Males:	
	Goats				Females:	
					Males:	
	Sheep				Females:	

MODULE 2: Pastoralism and wildlife

					Males:
	Donkeys				Females:
					Males:
B4	What were the critical constraints in livestock production during 2007/08? Codes: 1= lack of water 2= drought/lack of grass 3= diseases 4= lack of market 5=any other (specify) (you can have more than one constraint)				
	Cattle:	Camels:			
	Goats:	Sheep :	Donkey:		
B5	What are the commonly sited wildlife in the swamp and how do the community use them?				
	Animal name	Uses			
	1.				
	2.				
	3.				
	4.				
	5.				
	6.				
B6	What challenges does the community experience in sharing the swamp with wildlife?				
	1.				
	2.				
	3.				
B7	What are the management measures that can be taken to reduce the challenges?				
	1.				
	2.				
	3.				
B8	What do you say about wildlife numbers using the swamp over the years? 1= reduced 2= increased 3= remained the same 4= don't know				
B9	Reason for the answer above:				
B10	What plant species are available in the swamp and how does the community use them?				
	Species name	Uses:			
	1.				
	2.				
	3.				
	4.				
	5.				
B11	What cultural ceremonies are held at the swamp and how does the community conduct them?(Describe in detail)				

MODULE 3

MODULE 3: Changes in the Use of Shompole Swamp

C1	What do you use the swamp for as a household?			
	1.		3.	

MODULE 3: Changes in the Use of Shompole Swamp

	2.	5.
	3.	6.
C2	Have there been changes in the use of the swamp since 1970? 1= Yes 2= No	
C3	If yes, what are the changes?	
	1	3
	2	4
C4	What caused the changes?	
C5	What harmful effect does the swamp have on the household?	
	1	3
	2	4
C6	Were these harmful effects there since 1970? 1=Yes 2=No	
C7	If no to above, how was it then?	
	1	3
	2	4
C8	Are there things you used to get from the swamp that you can't get now? 1= Yes 2= No	
C9	If yes to above, what are they?	
	1.	3.
	2.	4.
C10	Have there been changes in the vegetation of the swamp? 1=Yes 2= No	
C11	If yes to above, what are the changes?	
	1	3
	2	4
C12	Have there been changes in size the swamp? 1=Yes 2=No	
C13	If yes to above, what are the changes? 1= reduced size 2= increased size 3=remained the same 4= I don't know 5= any other (specify)	
C14	Do you graze your livestock in the swamp? 1=Yes 2= No	
C15	If yes, what season do you graze there? 1= wet season 2= when there is no green grass 3= dry season 4= extremely dry season 5= I graze there all time of the year	
C16	How many months do you graze in the swamp now?	
C17	How many months were you grazing in the swamp in the past?	
C18	Has the months you graze in the swamp changed since 1970 or not? 1= it has changed 2= it has not changed	
C19	If the months have changed, what caused the changes?	
	1	3
	2	4
C20	What were the months you grazed there in the past? 1= January 2= February 3= march 4= April 5= May 6= June 7=July 8= August 9= September 10= October 11= November 12= December (<i>tick where appropriate</i>)	
C21	What months do you graze there now? 1= January 2= February 3= march 4= April 5= May 6= June 7=July 8= August 9= September 10= October 11= November 12= December (<i>tick where appropriate</i>)	

MODULE 4:

MODULE 4: Management of the Swamp

) Who is in charge of the use of the swamp now? 1= committee of elders 2= group ranch leaders 3= Provincial Administration (e.g. Appointed Committee 5= No body 6= any other (<i>specify</i>) (<i>Tick all that applies</i>)	
D2) If the answer above is an appointed committee, how is the committee appointed:	
D3) Who was in charge of the use of the swamp in the past (40 years)? (use options above or any other)	
) If the people in charge have changed, what may have caused the changes?	
D5) Who decides when the swamp can be used for grazing?	
D6) What process is taken in making the decision?	

D7) Is everybody allowed to graze in the swamp? 1= Yes 2= No
D8) If No, then who is allowed to graze in the swamp and when?
D9) Who is not allowed to graze in the swamp and when?
D10) Are there times when foreigners are allowed to graze but asked to leave when the drought is bad?
D11) When one defied procedures for the use of the swamp, what would the community do in the past? (describe in detail)
D12) When one defies procedures for the use the swamp, what does the community do now? (descried in detail)
D13) When rules for the use of the swamp were not favourable, what would the community do in the past? (describe in detail)
D14) When rules for the use of the swamp are not favourable now, what does the community do? (describe in detail)
D15) Were rules for the use of the swamp changed according to the prevailing weather conditions in the past? 1=Yes 2= No
If yes above, discuss how such changes were made and whom they would affect
D16) When there was misunderstanding over the use of the swamp amongst members, how did the community handle it in the past? (Describe in detail)
D17) When there is misunderstanding over the use of the swamp amongst members, how does the community handle it now? (Describe in detail)
D18) When using the swamp in the past was there people employed to monitor how it was used? 1=Yes 2= No
D19) If Yes to above, who were these people and who did they report to?

D20) When using the swamp now are there people employed to monitor how it is used? 1=Yes 2= No
D21) If Yes to above, who are these people and who do they report to?
D14) What management challenges do you face in the use of the swamp?
D15) How can the management challenges be addressed?
D16) What should be done to improve the management of the swamp?
D17) What are the opportunities available to improve management of the swamp?
D18) What role does the provincial administration play in the management of the swamp?
D19) What role do group ranch leaders play in the management of the swamp?

MODULE 5:

MODULE 5: Strategies for strengthening collective action

E 1	Do you think the swamp is well used? 1=yes 2= No
E2	If no, how is it misused?
	1
	2
	3
E3	What can be done so as to use it well?
	1
	2
	3
E4	Who do you think should be in charge of the swamp?
E5	Do you like the way the swamp was used in the past (40 years)? 1=Yes 2= No
E6	If yes above, why?
E7	Other than community members, who else should be involved in the management of the swamp and what role would they play?

