SUBDIVISION AS A CATALYST FOR LAND USE CHANGE AND ITS CONSEQUENT EFFECT ON THE ECONOMY AND ECOSYSTEM OF LOITOKITOK DISTRICT, KENYA

A THESIS

Presented to

The Faculty of the Department of Economics and Business

The Colorado College

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Arts

By

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May 2011
Since the formation of Kimana Group Ranch in 1972, land tenure in Loitokitok District has been based on a system of communally owned group ranches. Currently, only five group ranches remain, as Kimana has been fully subdivided. This study assessed the effects of subdivision on Kimana Group Ranch and forecasted the effects that subdivision will have on Mbirikani and Kuku Group Ranches. An emphasis was placed on diversification of land use and how that relates to the economy and ecosystem of the region. A semi-structured questionnaire was used to interview 369 residents of the three group ranches. Interviews were also conducted with key informants, such as ministry officials, group ranch officials, and representatives from non-governmental organizations. Data was analyzed using a multiple regression linear probability model and chi-square goodness of fit statistical tests. GIS points were also analyzed to create a map of land plots that have and have not been sold within Kimana Group Ranch and the wildlife sanctuaries that it contains. Results showed that the factors that most greatly influence one’s decision to diversify their livelihood strategy are ethnic background, acres owned, and the perception that their current land use affects their opinion of subdivision. Diverse land uses such as leasing plots, conservation areas, and development are, unlike pastoralism and agriculture, not as susceptible to adverse affects from unforeseeable difficulties, such as drought. Community involvement in conservation and other sustainable economic endeavors is necessary for subdivision to be successful. It is also vital that landowners be educated on the importance of land so that they can make an informed decision about selling.

**KEYWORDS:** (Loitokitok District, Kenya, group ranches, land use changes, pastoralism, Maasai, subdivision)
# TABLE OF CONTENTS

ABSTRACT iii
ACKNOWLEDGEMENTS iv
1 INTRODUCTION 1
2 OVERVIEW OF STUDY SITE 8
3 LITERATURE REVIEW 13
   3.1 Kenyan Land Tenure 13
   3.2 Environmental Effects 15
   3.3 Economic Effects 18
   3.4 Social Effects 20
4 THE STUDY 24
   4.1 Methodology 24
   4.2 Quantitative Results 26
      4.2.1 Demographics 27
      4.2.2 ANOVA 28
      4.2.3 Linear Probability Model 28
      4.2.4 Complete Regression Equation 31
      4.2.5 Tests for Normality and Heteroskedasticity 31
      4.2.6 Variable Correlation 31
      4.2.7 Linear Regressions for Individual Group Ranches 32
   4.3 Qualitative Results 33
      4.3.1 Value Systems 36
   4.4 GPS Analysis 38
5 DISCUSSION 41
   5.1 Conditions within the Study Site 41
   5.2 Socioeconomic and Cultural Impacts of Subdivision 42
      5.2.1 Development and Sedenterization 43
      5.2.3 Land Sale 43
      5.2.4 Wildlife 44
      5.2.5 Livelihood Strategy Diversification 45
   5.3 Demographic Profile of the Successful Subdivided Group Ranch Resident 47
   5.4 Suggestions 49
LIST OF TABLES

4.1 Independent Variable Definition and Values .............................................. 27
4.2 Summary Statistics ..................................................................................... 28
4.3 Results of Regression Analysis ................................................................. 30
4.4 Results of Individual Group Ranch Regression Analysis ......................... 33
4.5 Key Informants’ General Opinions ............................................................ 34
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure Number</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Maasai Women and Men Near Amboseli National Park, Kenya</td>
<td>2</td>
</tr>
<tr>
<td>1.2</td>
<td>Map of the Study Site</td>
<td>5</td>
</tr>
<tr>
<td>4.1</td>
<td>Land Sales in Kimana Group Ranch and the Surrounding Wildlife Sanctuaries</td>
<td>39</td>
</tr>
<tr>
<td>4.2</td>
<td>Number of Acres Owned by Kimana Residents</td>
<td>40</td>
</tr>
</tbody>
</table>
Acknowledgements:

A sincere thank-you to everyone involved in this study. Thank you to the Economics Department at Colorado College for allowing me the opportunity to write this thesis. A special thanks to my advisor, Vibha Kapuria-Foreman, for being ever helpful and patient during my sporadic visits to her office. Many thanks to everyone at the Center for Wildlife Management Studies in Kenya, especially Salaton Tome, who was a vital contributor to the success of my research. His dedication to the study was apparent in his enthusiasm displayed day in and day out. Thank you to all of the local guides for offering their knowledge of English, Maa, and Swahili, as well as for making long days of field work very enjoyable. Finally, thank you to all the community members who participated in the interviews and allowed me into their homes. This study would not have been possible without you.
CHAPTER I
INTRODUCTION

Indigenous peoples from all over the world face struggles such as inadequate healthcare, poor educational systems, depleting land, and controversial water rights.\(^1\) Africa is no exception to this rule, as the Maasai, recognizable for their traditional attire (Figure 1.1), have been both critiqued and celebrated for maintaining their traditional customs. Maasai are traditionally pastoralists, although today you can find Maasai in most every aspect of Kenya’s economy. The Maasai’s ancestors, the Cushites, have been practicing pastoralism since about 3000 BC.\(^2\) As the Cushites migrated south to the fertile Rift Valley and semi-arid highlands of south-central Kenya and northern Tanzania, they blended with existing hunter-gatherer populations and sorghum and millet farmers from Sudan. By 1000 BC, there were three groups of peoples living out agro-pastoral-hunting economies.\(^3\) Many Maasai still practice the same livelihoods that have been specialized

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\(^3\) Ibid.
over the past 3000 years. These old traditions of living off the land and, in the words of internationally renowned photojournalist Dan Eldon, “the raw reality of the basic human need for survival” have led to the modern romanticized appreciation for the Maasai and their ways. Many Maasai have capitalized on this appreciation and make a living through cultural tourism.

FIGURE 1.1

MAASAI MEN AND WOMEN NEAR AMBOSELI NATIONAL PARK, KENYA

It is ironic that modernization has allowed for this type of tourism because it has also brought the Maasai many hardships. Very few communities have escaped the effects of modernization; the Maasai are not one of the few. The adversities brought about by modernization are characterized by a few distinct events: colonization, independence, and drought. The Maasai have had to change and adapt to deal with many land tenure transformations resulting directly or indirectly from these adversities.
Maasai territory reached its furthest extent in the mid-19th Century. Coincidentally, this was around the same time as European arrival. The disputed 1904 and 1911 “Anglo-Maasai Agreement” treaties reduced the Maasai’s territory and relegated them to reservations that were much less fertile. This began the process of land alienation and this has continually increased impoverishment, stress on the land, and social marginalization. “[The Maasai] developed a formal ethnic identity not because they were in search of a community but because, as boundaries hardened under colonial definition, the loosely articulated community that they had could not deal effectively with outsiders without one.” The 1911 treaty was especially hard-hitting for the Maasai because it removed them from the lush and productive Laikipia Plateau. In subsequent years, the Maasai organized a land loss association to speak at Land Commission hearings and 15,000 Kenyans from all tribes organized the Land Freedom Army. Ultimately, these organizations were not strong enough to bring about any change in land tenure policy. However, despite organizational impotencies, the Land Freedom Army did cause enough of a stir for British defense to declare Kenya a “State of Emergency” in 1953. Eventually, after a decade of transformation, Kenya received formal independence on December 12, 1963.

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7 Ibid.

After independence, the government implemented the group ranch model in Maasai territory and one hundred and fifty nine group ranches were formed in Kenya. The group ranch model was created in an effort to encourage a less environmentally destructive and more economically viable method of livestock keeping, while creating demarcations between pastoral rangeland and the expanding agricultural areas. Each group ranch, acting as a single entity, was to be headed by an elected group of representatives according to a written constitution. The constitution would orchestrate the utilization of the resources contained within the group ranch for the overall benefit of the people living within its boundaries. This system allowed long standing traditional systems, such as pastoralism, to be given legitimacy and authority within a modern context.

However, these group ranches, which were meant to contain sufficient grazing land during both wet and dry seasons, have been shown to be highly vulnerable to the effects of drought because of overstocking and global climate change. On top of this external threat to the group ranch system, a desire for personal ownership of land and the allure of greater profit and development towards a more modern settlement has led to the recent phenomenon that faces group ranches today: subdivision.

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Subdivision is land privatization in the group ranch system. This study will focus on three group ranches in Loitokitok District, Kenya (Figure 1.2).

FIGURE 1.2

MAP OF THE STUDY SITE

The group ranches are Kuku, Mbirikani, and the recently subdivided group ranch of Kimana, where each member, in theory, received 60 hectares within the last ten years. While still a new concept, Kimana Group Ranch has been used as a model for those in neighboring group ranches that are advocating a similar subdivision for their communal lands and resources. The shift from communal land, where members only have rights to use and
exclusion, to private ownership, grants individuals the rights of transfer.\textsuperscript{13} Rights of transfer include the power to sell and lease your land. In such an ethnically homogenous community like the Maasai group ranches, allowing outsiders to own or lease land will have social, economic, and ecological implications.

In addition to rights of transfer, land ownership also grants the owner full control over how their land is used. With the exception of a few cases, group ranch leadership never allowed for agriculture plots because they would deplete resources for others using the land. Maasai were also not inclined to cultivate because they moved seasonally with their livestock. With land subdivision, agriculture is becoming a predominant livelihood strategy, both in terms of subsistence and for exporting. Chapter III is composed of a comprehensive literature review about the implications of land sale and diversification of livelihoods.

It is important to remember that the Maasai and their livestock are not the only living creatures in Loitokitok District. There are diverse ecosystems that also depend on water and food for survival. The most visible members of the Amboseli ecosystem are the large mammals. Fenced national parks are not as viable as unfenced ones because wildlife needs to migrate seasonally. Fences create ecological islands that are not sustainable for large mammal populations.\textsuperscript{14} Although it is likely that subdivision will create more fences, hindering wildlife, it also has the opportunity to create large conservation easements. These easements have the potential to create practical wildlife migratory corridors and tourism revenues for the Maasai.


Other plausible post-subdivision land uses are building a small business or leasing land to a large tourist resort. Some parts of Loitokitok District are very close to Amboseli National Park and would make prime real estate for tourist lodges. Once an individual has ownership and control of their land, the possibilities are extensive. However, when the environment is so fragile and the people are susceptible to exploitation, it becomes extremely important to determine which land use is the most beneficial for the area. All possible land uses for post-subdivision will have varying and potentially drastic effects on the environment and economy of the area. This study will explore the effects of all possible land uses and then calculate the likelihood of pastoralism continuing on.

By determining the likelihood that a Maasai in Kimana will diversify their livelihood or continue with solely pastoralism, we will gain a better understanding for the future of the Amboseli region’s ecosystem and economy. Chapter IV discusses the methodology used for data collection as well as information from key informants. It determines which socioeconomic factors influence the decision to diversify one’s livelihood strategy post-subdivision. Chapter IV also provides data analysis and results, and Chapter V discusses these results. This thesis serves to determine the likelihood that a group ranch member, or ex-member, will diversify their livelihood to include more than just pastoralism and what effect that diversification will have on the area.
CHAPTER II
OVERVIEW OF STUDY SITE

Kenya, with a rising population of 41,070,934 people in March 2011, is bordered by Ethiopia and the Sudan to the north, Somalia to the northeast, Uganda to the west and Tanzania to the south. The majority of Kenyans are living and working as agro-pastoralists. This study concerns land tenure as it relates to the economy of Kenya’s southern rift valley, with a focus on the Loitokitok District, specifically studying the Mbirikani and Kuku Group Ranches and the recently subdivided Kimana Group Ranch.

Loitokitok is situated in the southeastern portion of Kajiado District. Kajiado is in the Rift Valley Province of Kenya and consists of four distinct landscapes: the Rift Valley, the Athi-Kapiti Plains, the Central Hills, and the Amboseli Plains. Loitokitok District consists of varying geological features, which in turn create the Tsavo-Amboseli ecosystem. Its geographical regions include the Chyulu Hills, the foothills of Mount Kilimanjaro and the rangelands. The vegetation types, soil types, and amount of rainfall vary greatly within the three aforementioned ecosystems, which is mainly due to the variations in altitude. Mbirikani extends into the temperate and relatively moist Chyulu Hills, while Kimana and Kuku are much more arid. All three regions experience the ‘short rains’, which typically occur between the months of November and January, and

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15 CIA World Factbook: (2011)
the ‘long rains’, which typically occur during March through May.\textsuperscript{17} Even though the
rains in the different ecosystems follow the same seasonal pattern, the amount of rain that
each area receives varies greatly. The average amount of rainfall changes from year to
year; however, the standard amount for the rangelands is 350 millimeters, 800-1200
millimeters for the Chyulu Hills region, and 1250 millimeters for the foot slopes of
Mount Kilimanjaro.\textsuperscript{18} None of the group ranches extend into the foot slopes because the
best land was distributed to ‘Individual Ranches’ of powerful individuals and families,
whereas the Maasai were given land in the dry rangelands. Due to the lack of rainfall in
the rangelands, these areas are very dependent on mountain runoff from Kilimanjaro and
rainfall received in the Chyulu Hills, which then drains into the lower plains. The glacial
runoff from Kilimanjaro supplies water to springs and underground aquifers, of which
local people depend on as permanent water sources. The rain from the Chyulu Hills feeds
the Kikarankot and Nolturesh river systems, which eventually drain into the Kimana
River and Swamp. The group ranches are highly dependent on these water systems in
order to make agriculture an appealing livelihood strategy.\textsuperscript{19}

The soil types within this region immensely affect the natural vegetation types
and the success of crops. The soils within the foothills are composed of colluvium and
alluvium deposits which are derived from volcanic rocks from Mount Kilimanjaro.\textsuperscript{20}

\textsuperscript{17} J. Worden, R. Reid, and H. Gichohi, “Land-Use Impacts on Large Wildlife and

\textsuperscript{18} Ibid.

\textsuperscript{19} Ibid.

\textsuperscript{20} E.N.K. Mugai and P.J.K. Kanake. “Detailed Soil Survey of Kimana Irrigation Scheme,
Oloitokitok Division, Kajiado District, Kenya Agricultural Research Institute National Agricultural
These soils have had time to develop, supplying them with the necessary nutrients for complex vegetation types. The Chyulu Hills region consists of porous soil complexes that drain quickly and are shallow and gravelly textured, making them unsupportive of many perennial vegetation species. The soils of the rangelands are unable to retain water due to erosion, and thus lack many nutrients. Rain drains quickly through the soils and they are made up of a sandy-clay composition.\textsuperscript{21} The vegetation types and coverage are dependent on the amount of rainfall and soil composition, thus leading to significant differences between ecosystems in the region.

There are three prominent forms of land-use in the region: agriculture, pastoralism, and conservation through tourism. Before colonization in the early 1900s, the land was controlled by Maasai pastoralists, who roamed freely depending on where water and grazing were available at a particular time of the year. With the arrival of European settlers, land was sectioned off and sold to colonists. The indigenous system of land tenure was completely disregarded, leaving the Maasai with limited amounts of land to live and graze cattle on. After gaining independence in 1963, the Kenyan government was concerned with land management in pastoral areas and the shortage of land available for pastoralism in areas that had been largely converted to agriculture.\textsuperscript{22}

The idea behind group ranch model was to develop a system to encourage pastoralism, limit environmental degradation, conduct agriculture only in viable areas, and to promote wildlife management and conservation.\textsuperscript{23} Unfortunately, this desire to


\textsuperscript{22} P. Kameri-Mbote, “Property Rights and Biodiversity Management in Kenya” (2002).

\textsuperscript{23} D.J. Campbell, H. Gichohi, A. Mwangi, and L. Chege, “Land use conflict in Kajiado District,
limit agriculture was undermined in the 1970s and 1980s when a large influx of different tribes and immigrants from other East African countries migrated to the central and southern rift valleys. They purchased plots of land being sold by the owners of Individual Ranches. Many of these outsiders were not pastoralists, and used their purchased parcels of land strictly for agriculture, regardless of the ecosystem in which it was located. The group ranches continue to be unsuccessful due the fact that only a few members are permitted to be involved in the distribution and politics of the lands. All three of the group ranches researched in this study are experiencing similar management issues; however, they are all facing different environmental issues affecting the sustainability of member’s livelihoods.

The lands of the Kimana group ranch consist solely of rangelands, and a swamp located on the border of Mbirikani and Kimana group ranches. This waterway supplies little relief to the arid landscape, denying members water security. Parts of Mbirikani experience similar water issues, however the group ranch also extends into the Chyulu Hills, which supplies abundant forage and water for much of the year. Kuku group ranch is located closer to the foothills of Kilimanjaro, however it is still considered a semi-arid area, receiving little rainfall. Kuku group ranch also contains a series of wetlands within its boundaries, which are utilized by both people and wildlife.


With the increase in population and livestock, many group ranches are unable to support third and fourth generation members, causing internal conflicts. The ethnic composition is rapidly changing throughout all of Kenya, with people from other tribes and countries coming in search of work. With the continuous influx of other tribes such as the Luos, Kikuyus, and Kambas, along with Tanzanians, much of the land once relied on for grazing is being sold for agriculture. The present is a crucial time for all of the group ranches. With the recent division of the Kimana Group Ranch, and talk of dividing the Kuku and Mbirikani Group Ranches, many individuals are left with decisions to make about the possibilities of expanding into agriculture or other ways to diversify their livelihood strategies.

CHAPTER III
LITERATURE REVIEW

Most of the literature pertaining to group ranch subdivision has an environmental focus. This is due to the fact that East Africa is one of the few locations on Earth that has yet to kill off all of its natural predators. Large African mammals, such as elephants and lions, generate substantial revenue through tourism and are generally renowned for their majesty. It is unfortunate that the habitat of these animals is being degraded, and that the people of these lands are not receiving any economic benefit for preserving these mega-fauna and their environment. This literature review will illustrate the issues facing the southern Kenyan rangelands, specifically the Tsavo-Amboseli ecosystem in Loitokitok District. It will explore the socioeconomic status of the Maasai and the utilization group ranch land. It will also look at which land uses are most beneficial to the economy, ecosystem, and livelihood of Maasailand.

3.1 Kenyan Land Tenure

The government primarily influences Kenyan land tenure. Colonization brought about institutional change, which, among other things, forced the Maasai to relocate to more arid reservations. After independence, in 1963, there was a push towards

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privatization as the Kenyan government sought to formalize land rights. In an attempt to legitimize traditional pastoralism and to prevent fragmentation of wildlife’s habitat with fences marking property boundaries, the Land Act of 1968 established the group ranch system.

A group ranch is defined as, “a livestock production system or enterprise where a group of people, generally the traditional occupants, jointly own freehold title to land yet continue to herd their own livestock.” In the case of Loitokitok District, Maasai pastoralists inhabit six group ranches. Although a good idea in theory, within the last 20-30 years, there has been a push towards subdivision and privatization of the group ranches. Subdivision is the dividing of the group ranch land into 60-hectare plots for private ownership by each member.

In the beginning, the motivation towards subdivision came from governmental policy and the desire for commercialization and management of the rangelands; however, the idea has since been supported by pastoralists due to corrupt group ranch management and the desire for security of ownership. Subdivision is also strongly supported by cultivators because due to group ranch legislation, they generally cannot practice

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agriculture on communal land.\textsuperscript{32} There have been a few exceptions like in the case of Rombo Group Ranch, where the cultivators received permission from group ranch authorities to cultivate.\textsuperscript{33} There have also been a few other cases of cultivation on group ranches and although these exceptions do exist, most group ranch areas do not allow cultivation; thus, as subdivision increases, so will agriculture.

The demand for agriculture has increased because of frequent drought and exportation opportunities. It is also viewed as a natural means of progression and development. After independence, Kenyans gained back the rights to their land and began practicing agriculture as a way of exerting that independence. It is worrisome that the same circumstance could occur with individuals in the group ranches. If everyone began practicing agriculture, the arid environment would not be able to sustain it for very long.\textsuperscript{34}

With livestock numbers dwindling due to severe drought, the Maasai need to farm for subsistence as well as for cash. After interviewing several farmers, it was clear that most exported French beans and then kept other crops like maize and tomatoes to sell in the local market or to feed to their families.

3.2 Environmental Effects


Arid and semi-arid grasslands cover more than 40% of the earth’s land surface. They are also home to the highest remaining concentrations of large mammals, as well as to half of the world’s endemic bird species.\textsuperscript{35} The rangelands are a fragile environment, meaning they are easily susceptible to drought and soil erosion. Specifically, “Amboseli is an Arid and Semi-Arid Land (ASAL) that experiences ecological constraints, resource limitations, and low economic investment.”\textsuperscript{36}

In addition to being a delicate environment, it has been proven that 70 percent of Kenya’s wildlife migrate to and live in “dispersal areas,” which are the areas surrounding unfenced national parks.\textsuperscript{37} Dispersal areas are necessary for large mammals so that they have enough land to graze on or hunt on. They are also vital to animals that migrate because dispersal areas allow for migratory corridors connecting different national parks. Pastoralism is a good land use for these dispersal areas because unlike agriculture, it does not depend on sedentary lifestyles and livelihoods. Sedentary lifestyles bring about permanent structures, towns, and fences. Although these may be good for development in the economic short run, they will eventually deplete resources and kill of wildlife, most of which has the potential to bring in substantial revenues.

Currently, there are several ways that ASALs are being used: pastoralism, agriculture, and wildlife conservation. Irrigated agriculture is one of the worst ways that

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an ASAL can be used because it requires too much water and depletes the soil of nutrients. Davies makes the argument that mobile pastoralism is the perfect land use for ASALs because it requires movement, which prevents overgrazing. The pastoralists’ ability to adapt to the variability of product inputs, such as pasture and rainfall, also promotes ecological viability. He, along with Butt and Western, believes that these communally owned Group Ranches are the most environmentally sustainable. This has been true for the forty plus years that group ranches have existed and although it is more difficult to uphold in times of drought, it still holds true.

Wildlife conservation is also beneficial for the environment, along with other types of ecotourism. These “Protected Areas” are land owned by several Maasai but managed by one or two and often by an outside source. Unfortunately, the revenues are rarely returned to the local people because of corruption and foreign beneficiaries. This has caused dissatisfaction with wildlife conservancies, a further pull away from jointly owned endeavors, and a push towards subdivision. However, some communal group ranch members support protected areas because they feel that the international support for


land and wildlife conservation would help secure their land rights. Ultimately, this is representative of the fact that secure land rights, brought about by subdividing group ranches into 60-hectare plots, are extremely valuable to the Maasai.

3.3 Economic Effects

Thorton, Galvin, and Boone conducted a study in the Ngorongoro Conservation Area (NCA) of northern Tanzania. They used the PHEWS model (Pastoral Household and Economic Welfare Simulator) to estimate the effect of 3% and 6% population increases among the Maasai pastoralists. Their results show that every household in NCA relies, to some degree, on an outside source of calories for subsistence. The model also showed that even with the current human population levels, pastoralist welfare is under severe pressure.

The PHEWS model was also applied in Loitokitok. The results showed that over the past 30 years, livestock-to-human ratios have declined so much that pure pastoralism is no longer an option. One of the major causes of herd reduction is subdivision of the group ranches, as households sell livestock to generate cash in times of scarcity. The study also found that there are no uniform effects of subdivision because they differ by household. For example, if a family needs to send four children to school, than their cash needs increase and they will have to sell more livestock. The PHEWS model

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characterized households into different eight different clusters for categorization. The categories had to do with different livelihood combinations, made up of livestock keeping, livestock trading (business), rain-fed agriculture, irrigated agriculture, agriculture in the wetter part of the district, and whether cultivation was for subsistence or to sell. These eight household livelihoods were then matched to three wealth levels: poor, medium, and rich. The results showed that only 23 percent of households were considered rich based on livestock holdings alone. This reveals that livestock keeping is no longer a viable option by itself. The PHEWS model results highlight the differences between each group ranch and Heald’s study strengthens this argument by noting the increasing pattern of social differentiation between rich and poor families.

The effects of subdivision also differ by region. Just west of Loitokitok is the Maasai-Mara National Reserve. Here, subdivision has led to diversification of Maasai livelihoods, including leasing land for large-scale cereal cultivation. Loitokitok has not experienced any large scale farming due to the lack of good road access to markets, machinery, and fences to keep out wildlife.

Many pastoralists support subdivision because they believe that agriculture is more profitable than pastoralism or conservation. This is a legitimate belief due to the fact that in the Ngorongoro Conservation Area, less than 10% of the Maasai receive any

46 Ibid.
income from tourism and only 0.2% use tourism to obtain their primary income. However, this is due to corruption and weak institutions, not because conservation and tourism are less productive.

Most of the articles view subdivision as being negative; however, empirical data from a Samburu tribe in Siamba, Kenya views subdivision in a positive light. Individual ownership benefitted this community with additional food and cash flow from the increase in agriculture. In turn, this cash enabled them to preserve their livestock wealth and to have more savings to sustain them during ecological scarcity. Although it is commonly thought that subdivision leads to increased land sales, in this case they actually decreased.

3.4 Social Effects

It is important to note the corruption and lack of transparency in the governing bodies of Kenya and of the group ranches. Radeny’s article stresses the importance of making the information that is generated in her study, and other studies like it, accessible to the Maasai people. The United Nations argues that, “A community can get more food by converting a vital wetland or forest to farmland, but in doing so it may lose irreplaceable environmental goods and services such as timber, biodiversity, clean water,


flood regulation and drought control.”\textsuperscript{53} It is important for information like this to be passed onto the Maasai so that they can make educated decisions.

In a case study of Samburu pastoralists in Kenya, the adoption of private property emerged out of conflict and created new social norms concerning land rights and authority. A few formally educated men went against the cultural norms set out by the elders and convinced them of the value of private property.\textsuperscript{54} It turns out that in many communally owned group ranches, like with the Samburu, the wealthy own many livestock so they are opposed to subdivision because they need more grazing land.

This literature review further illustrates the importance for empirical data. The subdivision in Loitokitok will be different than in other locations and will lead to land leasing to other tribes, which may have unforeseen consequences. The Maasai have strict cultural stigmas, which prevent the killing of wildlife. Other tribes do not have these stigmas, so wildlife could be at risk.

Traditionally, the Maasai have been celebrated for their ability to resist Westernization and live off of the land and their livestock. Their traditional culture is conducive to environmentalism, as it forbids killing wildlife and values a nomadic, pastoralist livelihood. This nomadic lifestyle has allowed mega-fauna to thrive in the rangelands of East Africa.\textsuperscript{55}

\textsuperscript{53} United Nations. \emph{The Millennium Development Goals Report} (New York, USA: UN Headquarters, 2006).


\textsuperscript{55} David Western, Rosemary Groom, and Jeffrey Worden, “The impact of subdivision and sedentarization of pastoral lands on wildlife in an African savanna ecosystem.” \emph{Biological Conservation} 142 (2009): 2538-2546.
“Most of the Amboseli rangelands do not support cultivation, and other alternative land uses that can thrive in this ecosystem need to be explored, promoted and supported to meet local and socio-economic needs.”56 Government land policies have deep and complicated effects on regions, people, and the cultures involved. These effects do not differ all that much from region to region, so societies can make informed decisions by studying and learning from these trends.57

An area that has yet to be studied, however, is what affects an individual’s decision to maintain a purely pastoral livelihood or to diversify. This thesis will serve to determine if education levels, household size, gender, and size of livestock herd influence a group ranch member’s desire to diversify their livelihood after subdivision. In turn, diversification to agriculture, business, or conservation easements affects the aforementioned aspects of the environment, economy, and social customs.


CHAPTER IV
THE STUDY

4.1 Methodology

Three hundred and sixty-nine semi-structured questionnaires were administered in the group ranches from November 13th to 22nd, 2009. The administration of these interviews was orchestrated by the Center for Wildlife Management Studies, sponsored by the School for Field Studies. The questionnaires were primarily designed to supply data about the effect of subdivision on wildlife, so some of the questions are irrelevant to this study and have therefore been left out of the text.

Seven American researchers, each accompanied by one Maasai translator, administered the questionnaires. The researchers walked through the group ranches and stopped at every other homestead to interview the owner or his wife. In the event that no one was home, the next consecutive homestead was interviewed. The researchers conducted interviews using the principles of Participatory Rural Appraisal (PRA). PRA aims to enable rural or exploited people to analyze their own reality through incorporating their knowledge and opinions into the planning of development projects.58

The interview results serve as a random sample of the residents of Kimana, Kuku and Mbirikani Group Ranches. One hundred and fifty-five of the responses are from Kimana, 157 from Kuku, and 43 from Mbirikani. These three group ranches were chosen because they are representative of the whole system; Kimana has already subdivided while Kuku and Mbirikani are on their way to subdivision. In addition to this representative sample, interviews with key informants and focus groups were also conducted. These interviews provide valuable qualitative data to supplement the quantitative analysis and bring concrete examples to the results. The interviewees included group ranch officials from Mbirikani and Kimana, local government officials, individuals from conservation NGOs, and gender and age based focus groups. The results from these meetings allow for a broader qualitative scope of opinions and facts about the subdivision of group ranches, although they are not quantitative enough to be incorporated into the statistical analysis.

All of the interviews, both in the field and with the key informant groups, were conducted using semi-structured questionnaires, which include both open and close-ended questions. The questionnaires asked about demographic information such as gender, age, ethnicity, size of household, level of education, and primary livelihood strategy. They also asked about general perceptions of the effects of group ranch subdivision, including the positive and negative effects on members of the group ranch, on wildlife conservation, on the natural environment, and on land use practices. Additionally, some questions were directed at particular group ranches because Kimana Group Ranch has already been subdivided and Kuku and Mbirikani Group Ranches are in
the process. Kimana Group Ranch can be used as a model to forecast the possible effects of subdivision on the remaining group ranches.

Land sale is a common side effect of subdivision, so a spatial analysis was conducted using GPS to locate and distinguish which parcels of land in Kimana have already been sold. Two hundred parcels of land were identified as either being bought or allocated after the subdivision of the group ranch. This information was used to analyze the effects of group ranch subdivision on the local community, who the land is being sold to, why it is being sold, and what that land is being used for.

The data collected from the questionnaires was coded, organized, and entered into several computer analysis programs. First, it was entered into the Statistical Package for Social Sciences (SPSS). The results were subjected to various statistical analyses to determine levels of variance between different variables. Cross tabulation tests explained the differences between selected variables and determined their relationship to one another. All of the percentages given in the text of this study were calculated with SPSS, as well as the p values that are given in parentheses.

Second, the data was entered into the Data Analysis and Statistical Software, STATA. Analysis of variance was used to determine if the variables were significantly different from one another. Regressions were run to determine which factors contribute to a landowners desire to change or diversify their livelihood strategy after subdivision. This information was supplemented with data from interviews and used to create a model for land use in the area post-subdivision. Lastly, the ArcView GIS software version 3.3 (Environmental Systems Research Institute, Inc., 2000) was used to interpret land parcel data that was collected on the GPS survey of Kimana Group Ranch.
4.2 Quantitative Results

The data was qualitative in its general nature so it was organized into numerical categories in order to be scientifically analyzed. All of the variables, except for time living in area, age, household size, and total livestock owned, were categorized as “dummy variables,” with values equal to zero or one. For variables that required more than two categories, multiple dummy variables were created. Results were first calculated with the group ranches as a whole and second for each individual group ranch. The variables are defined in their numeric categories as shown in Table 4.1.
TABLE 4.1
INDEPENDENT VARIABLE DEFINITION AND VALUES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male or Female</td>
<td>1 – Female, 0 – Male</td>
</tr>
<tr>
<td>Age</td>
<td>As defined by Maasai age sets</td>
<td>1 - Under 20; 2 - 21 to 30; 3 - 31 to 45; 4 - 56 to 60; 5 - Over 60</td>
</tr>
<tr>
<td>Ethnicbackground</td>
<td>Tribe of orientation</td>
<td>1 – Maasai, 0 – Otherwise</td>
</tr>
<tr>
<td>Primary</td>
<td>If attended primary school</td>
<td>1 – Primary, 0 – Otherwise</td>
</tr>
<tr>
<td>Secondary</td>
<td>If attended secondary school</td>
<td>1 – Secondary, 0 – Otherwise</td>
</tr>
<tr>
<td>Uniorprof</td>
<td>If attended university or professional trade school</td>
<td>1 – University or Trade School, 0 – Otherwise</td>
</tr>
<tr>
<td>Hhsize</td>
<td>Household Size</td>
<td>Number of family members</td>
</tr>
<tr>
<td>livelihoodstrategy</td>
<td>Present Livelihood Strategy</td>
<td>1 – Pastoralism Plus Agriculture, Conservation, Business, etcetera, 0 – Solely Pastoralism</td>
</tr>
<tr>
<td>timeinarea</td>
<td>Years lived in Loitokitok District</td>
<td>1 - &lt;1; 2 - 1 to 5; 3 - 6 to 10; 4 - 11 to 15; 5 - 16 to 20; 6 - 21+</td>
</tr>
<tr>
<td>acres</td>
<td>Acres owned (Kimana only)</td>
<td>Number of acres</td>
</tr>
<tr>
<td>voteforsub</td>
<td>Act or intent to vote for or against subdivision</td>
<td>1 – Yes, 0 – No</td>
</tr>
<tr>
<td>landuseaffectopinion</td>
<td>Belief that present land use/livelihood strategy affects opinion of subdivision</td>
<td>1 – Yes, 0 – No</td>
</tr>
<tr>
<td>toalllivestock</td>
<td>Total number of sheep, goats, cows, and donkeys owned</td>
<td>Number of livestock</td>
</tr>
</tbody>
</table>

DEPENDENT VARIABLE DEFINITION AND VALUES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>msas</td>
<td>Plans for future livelihood strategy</td>
<td>1 – Pastoralism Plus Agriculture, Conservation, Business, etcetera, 0 – Solely Pastoralism</td>
</tr>
</tbody>
</table>
4.2.1 Demographics

A majority (57%) of the sample size were females and the rest were males. Most were Maasai (89%), with Kikuyu (6%) and Kamba (3%) being the next most common ethnicities. A majority (55%) had no formal education and 32% had been to primary school. Less than 2% had completed college or university. Seventeen percent of those interviewed were not members of any group ranch. Thirty four percent belong to Mbirikani Group Ranch, 18% to Kimana, and 28% to Kuku. Summary statistics of all the variables are displayed in Table 4.2.

TABLE 4.2
SUMMARY STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain same land use post-subdivision</td>
<td>0.75</td>
<td>0.19</td>
</tr>
<tr>
<td>Time living in area</td>
<td>4.20</td>
<td>2.95</td>
</tr>
<tr>
<td>Sex</td>
<td>1.57</td>
<td>0.25</td>
</tr>
<tr>
<td>Age</td>
<td>2.83</td>
<td>1.23</td>
</tr>
<tr>
<td>Ethnic Background</td>
<td>0.89</td>
<td>0.10</td>
</tr>
<tr>
<td>Primary School</td>
<td>0.31</td>
<td>0.22</td>
</tr>
<tr>
<td>Secondary School</td>
<td>0.11</td>
<td>0.10</td>
</tr>
<tr>
<td>University or Trade School</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Household Size</td>
<td>1.78</td>
<td>0.65</td>
</tr>
<tr>
<td>Livelihood Strategy</td>
<td>0.72</td>
<td>0.20</td>
</tr>
<tr>
<td># Acres (Kimana Only)</td>
<td>2.37</td>
<td>2.62</td>
</tr>
<tr>
<td>Vote for subdivision?</td>
<td>0.76</td>
<td>0.18</td>
</tr>
<tr>
<td>Total Livestock</td>
<td>5.27</td>
<td>10.69</td>
</tr>
<tr>
<td>Land use affect opinion of subdivision?</td>
<td>0.62</td>
<td>0.24</td>
</tr>
</tbody>
</table>
4.2.2 ANOVA

An analysis of variance was run on all of the variables to ensure that they were not too statistically similar. The probability came out to be zero, which means there is no chance that all of the variable means will be equal. ANOVA could have been used for further analysis; however, not all of its assumptions were met so it was best to move on to another model.

4.2.3 Linear Probability Model

A multiple regression linear probability model was used to determine the effects of the thirteen independent variables on one’s act or intent to maintain the same land use post-subdivision. In this model, the dependent binary variable measures plans for future land use and equals zero when the individual plans to stay with solely pastoralism. The dependent variable equals one when an individual has, or has plans to, diversify their livelihood strategy after subdivision. The null hypothesis is that none of the independent variables affect one’s decision to diversify their livelihood and the alternative hypothesis is that at least one variable does affect it.

When all of the independent variables are regressed, they account for roughly 54% of an individual’s desire to diversify their land use after subdivision (adjusted R-squared = 0.5422). This is a considerable amount of explanation for the dependent variable; however, it becomes less reputable when noted that there are thirteen independent variables influencing it. The lack of significant explanation for the dependent variable can be attributed to three possible reasons. Reason number one is that there may not be only one or two variables affecting one’s decision to maintain the same land use post-subdivision, while a second form of explanation is that this study failed to
find those one or two variables. Conducting further research to find one or two highly correlated variables was outside the scope of this research because the data was collected in advance, and it was not feasible to return to Kenya to collect more. The third possible reason for the lack of significant explanation for the dependent variable is that a linear model may not be the best fit for the data. A logistic regression was another possible model; however, with so many variable values equal to zero and one, the results came out to be, quite literally, null and void.

Nonetheless, one’s decision to change their livelihood after subdivision is influenced by several factors, most significantly the group ranch they live in, their ethnicity, the number of acres they own (only valid in subdivided Kimana Group Ranch), and whether they would or did vote for subdivision. The aforementioned independent variables all have p values under 0.05, meaning there is less than a five percent chance of rejecting the null hypothesis when it is true. Acres owned and voting preference are statistically significant at the one percent level, showing an even stronger correlation. Table 4.3 illustrates the linear regression coefficients and how they fit into the regression equation: \( Y = \beta_0 + \beta_1 \text{sex} + \beta_2 \text{ethnicbackground} + \beta_3 \text{hhsize} + \beta_4 \text{livelihood} + \beta_5 \text{livestock} + \beta_6 \text{timeinarea} + \beta_7 \text{age} + \beta_8 \text{primary} + \beta_9 \text{secondary} + \beta_{10} \text{uniorprof} + \beta_{11} \text{acres} + \beta_{12} \text{voteforsub} + \beta_{13} \text{landuseaffectopinion}, \) where \( Y = \) the decision or intent to diversify livelihood strategies after subdivision and the independent variables are as defined in Table 4.1.

The independent variables with the strongest coefficients are ethnicity, acres owned, preference to vote for subdivision, and if the interviewee attended university or professional trade school. An interviewee is 29.9% more likely to diversify their
livelihood strategy if they are Maasai and 21.2% more likely if they voted for subdivision. Conversely, people who own more acres are 32.3% less likely to diversify and 10.5% less likely if they have attained some form of higher education.

TABLE 4.3
RESULTS OF REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>– 0.087</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.298*</td>
</tr>
<tr>
<td>Household Size</td>
<td>0.044</td>
</tr>
<tr>
<td>Livelihood Strategy</td>
<td>– 0.041</td>
</tr>
<tr>
<td>Total # Livestock Owned</td>
<td>0.017</td>
</tr>
<tr>
<td>Time in Area</td>
<td>– 0.021</td>
</tr>
<tr>
<td>Age</td>
<td>– 0.012</td>
</tr>
<tr>
<td>Primary School</td>
<td>– 0.044</td>
</tr>
<tr>
<td>Secondary School</td>
<td>0.002</td>
</tr>
<tr>
<td>University or Trade School</td>
<td>– 0.105</td>
</tr>
<tr>
<td>Acres Owned (Kimana Only)</td>
<td>– 0.323**</td>
</tr>
<tr>
<td>Vote for Subdivision?</td>
<td>0.212**</td>
</tr>
<tr>
<td>Land Use Affect Opinion of Subdivision?</td>
<td>0.039</td>
</tr>
<tr>
<td>University or Trade School</td>
<td>– 0.105</td>
</tr>
<tr>
<td>Acres Owned (Kimana Only)</td>
<td>– 0.323**</td>
</tr>
<tr>
<td>Vote for Subdivision?</td>
<td>0.212**</td>
</tr>
</tbody>
</table>
4.2.4 Complete Regression Equation

\[ msas = 2.41 - 0.087(\text{sex}) + 0.298(\text{ethnicbackground}) + 0.044(\text{hhsize}) - 0.041(\text{livelihood}) + 0.017(\text{livestock}) - 0.021(\text{timeinarea}) - 0.012(\text{age}) - 0.044(\text{primary}) + 0.002(\text{secondary}) - 0.105(\text{uniorprof}) - 0.323(\text{acres}) + 0.212(\text{voteforsub}) + 0.039(\text{landuseaffectopinion}) \]

4.2.5 Tests for Normality and Heteroskedasticity

When working with a linear probability model, it is important that the residuals are evenly distributed, and unfortunately that was not the case with this regression. The residuals are not normally distributed and there is a 95 percent confidence interval that is skewed. Also unsettling is that only three of the variables have p values under 0.05. However, even though the data does not fit a linear model as well as it should, it is by no means a completely inaccurate model. The test for heteroskedasticity was good with a low chi-squared value of 2.08. The test for a variance inflation factor was also good, as all values were less than two, with a mean VIF of 1.26.

4.2.6 Variable Correlation

All of the independent variables were correlated in a matrix and two of the strongest relationships were between age and household size \((r = 0.4456)\), and between age and time in area \((r = 0.3764)\). These are both to be expected, as older individuals have had time to grow their households and have had more years to live in a certain area. A less predictable high correlation was between those who believe that land use affects their
opinion of subdivision and those who voted for subdivision ($r = 0.4614$). This is interesting because it not only shows a desire to diversify, but a plan to achieve that diversification through subdivision.

4.2.7 Linear Regressions for Individual Group Ranches

The variables were then separated into three groups, according to which group ranch the interview was conducted in. The probability of diversifying livelihood strategy after subdivision (msas) was calculated for each group ranch by regressing it in regards to all of the relevant independent variables. The linear models for each group ranch are depicted in Table 4.4. The independent variables account for about 45% of a Kimana resident’s plan to either diversify or maintain the same land use post-subdivision. In Kuku and Mbirikani, the percentages are a bit lower, 11% and 18%, respectively.

The coefficients that are the largest (and theoretically the most influential) across all three of the group ranches are university education and whether or not the residents believe that their land use affects their opinion of subdivision. The independent variable, “ethnicbackground,” was left out of the Mbirikani regression because it is all communal group ranch land, and therefore everyone is Maasai. The variables with the lowest p values in Kimana are acres owned and whether a university or professional trade school was attended. In Kuku, the only statistically significant variable is whether or not the interviewee plans to vote for subdivision, and in Mbirikani, only age is a significant contributor.
TABLE 4.4

RESULTS OF INDIVIDUAL GROUP RANCH REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>Group Ranch</th>
<th>Adjusted R-squared</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kimana</td>
<td>0.4551</td>
<td>msas = 1.75 – 0.05(timeinarea) – 0.07(sex) + 0.17(ethnicbackground) + 0.05(hhsize) + 0.13(livelihood) + 0.01(livestock) + 0.003(age) + 0.03(primary) + 0.02(secondary) – 0.76*(uniorprof) + 0.16(voteftosub) + 0.11(landuseaffectopinion) – 0.27**(acres)</td>
</tr>
<tr>
<td>Kuku</td>
<td>0.1101</td>
<td>msas = 1.46 – 0.02(timeinarea) – 0.12(sex) + 0.4(ethnicbackground) + 0.03(hhsize) – 0.03(livelihood) + 0.02(livestock) – 0.04(age) – 0.11(primary) – 0.14(secondary) + 0.62(uniorprof) + 0.22*(voteftosub) – 0.09(landuseaffectopinion)</td>
</tr>
<tr>
<td>Mbirikani</td>
<td>0.1779</td>
<td>msas = 0.54 + 0.03(timeinarea) + 0.67*(sex) – 0.13(hhsize) + 0.21(livelihood) – 0.04(livestock) + 0.09(age) – 0.21(primary) + 0.35(secondary) + 0.87(uniorprof) + 0.06(voteftosub) + 0.26(landuseaffectopinion)</td>
</tr>
</tbody>
</table>

* p < .05  ** p < .001

As with the complete regression, the individual group ranch regression has several faults. The residuals are not normally distributed, and there is a highly skewed confidence interval. Although this data is not convincing in a purely numeric form, it becomes more pertinent and applicable when it is supplemented with empirical data and observations.

4.3 Qualitative Results

The quantitative analysis is supplemented with vital information from focus group meetings and interviews with prominent community members. Assuming that people are rational, it is useful to gather insight into their thinking. Focus groups were conducted with women, men, and male youth from each group ranch. Interviews were conducted...
with visible community members including the Kimana Group Ranch Secretary, the Chairman of Mbirikani Group Ranch, a Project Manager from the Amboseli-Tsavo Group Ranch Association (ATGRA), a representative from the African Conservation Center (ACC), and officials from the Ministries of Agriculture and Livestock.

The interviews and focus group questions were centered around land tenure preferences and general views on subdivision. Getting an idea of the general sentiment about subdivision amongst a group of people helps to determine the likelihood that a group ranch member, or resident, will diversify their livelihood strategy to include more than just pastoralism. Interviewing group ranch and government officials allowed for a broader perspective on what effect that diversification will have on the region. A summary of the questions and responses is shown in Table 4.5.

<table>
<thead>
<tr>
<th></th>
<th>Agree with GR management?</th>
<th>Best land tenure regime for region?</th>
<th>General views on subdivision</th>
<th>Effects of subdivision</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Youth (male): Kimana</strong></td>
<td>Yes – GR helped pay school fees</td>
<td>Private – benefits of investments accrue directly to owner</td>
<td>Good – decline in corruption</td>
<td>Increased charcoal burning; increased development; decreased pastoralism</td>
</tr>
<tr>
<td><em>Youth (male): Kuku and Mbirikani</em></td>
<td>No – plenty of revenue but only benefits GR officials</td>
<td>Private – each landowner has freedom and sees direct benefits</td>
<td>Good – decline in corruption and increase in freedom</td>
<td>Depends on land use choice – agriculture and business will benefit, pastoralists will have to change land use</td>
</tr>
<tr>
<td>Men: Kimana</td>
<td>No – the leadership doesn’t evenly</td>
<td>Private – because people have freedom</td>
<td>Good – as long as people are educated on</td>
<td>Increased profits for those who hold their land;</td>
</tr>
<tr>
<td></td>
<td>distribute resources</td>
<td>dangers of selling land</td>
<td>increased poverty for those who sell</td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>----------------------</td>
<td>-------------------------</td>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Men: Kuku and Mbirikani</strong></td>
<td>No – resources aren’t properly managed and distributed</td>
<td>Communal – because private leads to land sale and government land tenure is corrupt</td>
<td>Good – as long as people are educated on the dangers of selling land</td>
<td>Decreases in both livestock and wildlife numbers; reduction in poverty as long as people don’t sell</td>
</tr>
<tr>
<td><strong>Women: Kimana</strong></td>
<td>Yes – GR gave scholarships before subdivision</td>
<td>Government – they see the big picture with sustainable land use</td>
<td>Good – when it promotes development; Bad – when people sell</td>
<td>Fewer cultural gatherings; more human-wildlife conflict</td>
</tr>
<tr>
<td><strong>Women: Kuku and Mbirikani</strong></td>
<td>No – members are neglected</td>
<td>Private – each person can use land as he sees fit</td>
<td>Good in agricultural areas; Bad in pastoral ones</td>
<td>Herd quality will increase as quantity decreases; poverty will be reduced as each receives benefit from his land</td>
</tr>
<tr>
<td><strong>NGO: ATGRA</strong></td>
<td>No – we as an NGO are doing the GR management’s job</td>
<td>Communal – with rigorous checks and balances</td>
<td>Good – as long as divided land doesn’t sit idle</td>
<td>Landlessness after selling for short term gain</td>
</tr>
<tr>
<td><strong>NGO: ACC</strong></td>
<td><em>Not asked</em></td>
<td>Group Ranches – to be used for pastoralism and conservation</td>
<td>Bad – the benefits of communal land outweigh the costs of not going private</td>
<td>After initial economic gain, the land use changes that come with subdivision will lead to ecological, and in turn economic, decline</td>
</tr>
<tr>
<td><strong>GR Official: Mbirikani</strong></td>
<td><em>Not asked</em> – but he said GR members are 50/50 in favor and against current management</td>
<td>Agricultural areas should be private; pastoral areas should be communal</td>
<td>Give each member some private land (near water) and access to some communal land as well</td>
<td>Bad for pastoralism; good for investments and agriculture – good in general as long as people</td>
</tr>
</tbody>
</table>
### 4.3.1 Value Systems

The key informant interviews and focus groups present diverse opinions on land tenure and subdivision. If it were solely up to the African Conservation Centre, no subdivision would occur because it fragments the landscape and hinders wildlife migration. The women from Kimana would prefer a governmental land tenure regime because, as said by Nice Kuya, “All transfers of property [need to] be legal and in logbooks. Whether it be a vehicle or property, the government can give equal distribution and title deeds. Choosing for your own family can cause conflict.” A majority of those interviewed, including the youth, the men from Kimana, and the women from Mbirikani

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59 Jackson Mwato, ACC Community Field Officer (Amboseli), personal communication.

60 Nice Kuya, personal communication.
and Kuku, believe that land tenure should be private because it gives the owner freedom to use their land as they see fit.

Land sale is a huge issue that was brought up in almost every meeting. A man from Kimana mentioned a side effect of increased poverty for those who sold their land after subdivision.\(^61\) Mwato Lomasiila, from Mbirikani, was concerned that, “Most will sell their land to non-Maasai or someone who won’t allow livestock on their land.” The men from Kuku and Mbirikani said that they would advise the formation of a committee to make sure land is not sold, because when people sell their land they are forced to live in the dry rangelands.\(^62\) They also mentioned that, due to corrupt management and allocation, it is common for group ranch members to receive a land plot that is extremely dry and has no access to water.\(^63\) Some of the women in the focus group were concerned that men were selling their land for short-term profits and then drinking away their money.\(^64\)

Land tenure and land sale preferences are both value systems that are central to this study. They influence who sells their land allocation and who stays to use the land post-subdivision. By determining which land uses (“pastoralism” or “pastoralism plus”), are popular among the people who keep their land, it is feasible to predict what the future landscape of Loitokitok District will look like. The only group ranch that has been fully subdivided so far is Kimana; henceforth, using Kimana Group Ranch as a precedent, it can be said that 86% of all group ranch residents will diversify their livelihood strategies.

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\(^{61}\) Simon Saiko Ole Tunda, personal communication.

\(^{62}\) Mwato Lomasiila and Suppeet Ole Maitumo, personal communication.

\(^{63}\) Ibid.

\(^{64}\) Magrid Pavrino, personal communication.
after subdivision. This data is supported with the fact that when asked, “Will you continue to use the land in the same way you are currently using it, if it is subdivided?” 74% of the residents of Kuku and Mbirikani replied, “no,” and that they would alter or at least add to their land use.

This study would have benefitted from data about the people who sold their land allocation and have since left the area. However, due to the fact that all of the questionnaires were administered to people living on the land, it was impossible to construct an accurate demographic profile for someone who had already moved away. Out of the 369 responses, only four people have plans to sell their land in the future, and they cited family or personal issues as the reason. Land sale is a very sensitive subject in Maasai culture so it was out of the scope of this research to accurately assess its causes.

4.4 GPS Analysis

It is possible, however, to tally a number for the amount of land plots that have been sold. This information was used to analyze the broad effects of group ranch subdivision on the local community, who the land is being sold to, why it is being sold, and what that land is being used for. Figure 4.1 illustrates these GPS points.
In addition to these GPS points, the questionnaires asked Kimana residents, “How many acres do you own?” Subdivision allocated each Kimana Group Ranch member 60 acres and now only 25% of residents still own 50 or more of those acres (Figure 4.2). This shows a very strong tendency to lease a portion of one’s land allocation. Leasing land is another form of livelihood diversification and can further strengthen the argument...
that group ranch subdivision will lead to more diverse land use and increased degradation of the surrounding environment.

FIGURE 4.2

NUMBER OF ACRES OWNED BY KIMANA RESIDENTS

- 50+ acres: 25%
- 36-50 acres: 38%
- 21-35 acres: 3%
- 5-20 acres: 32%
- <5 acres: 2%
CHAPTER V
DISCUSSION

5.1 Conditions within the Study Site

Kimana Group Ranch is fully subdivided and served as a control for this study. Kuku and Mbirikani Group Ranches are in the process of subdivision and Mbirikani has already subdivided 200 acres. Fifty-one percent of the total interviewed landscape was deemed as agro-pastoral and the remaining 49% as purely pastoral. Forty percent of those interviewed were primarily agro-pastoralists, while 28% solely practiced pastoralism and 17% solely carried out agriculture. The results indicate a strong preference to subdivide (75% said they voted or would vote for it) and it was even popular among people who have a negative opinion about the Kimana subdivision (47% would still vote for it). It is clear that subdivision will eventually overtake the group ranch system so it is important to discuss how this will affect the economy, environment, and culture of the Maasai and their land.

Sixty-four out of the 369 respondents are not members of any group ranch and 66% of those non-members reside in Kimana Group Ranch. This is to be expected, as Kimana is subdivided and it is not necessary to be a group ranch member in order to have land rights. Elang’ata/Olorika and Ichalai, which are partially subdivided sections of Mbirikani, also have non-group ranch members living within their boundaries, and after

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65 Grace Noomoni, personal communication.
Kuku and Mbirikani are subdivided, there are sure to be more non-members in the entire region.

Not only is the increase of non-Maasai in the group ranches a matter of outsiders buying and leasing land, but also it is representative of the fact that the group ranch system is disintegrating. It will eventually be impossible to be a group ranch member. Kimana stopped registering new members over ten years ago, and as of 2006, 32 out of 52 group ranches had been subdivided and 15 were in the process. This study served to explore the impact that subdivision had, and will have, on Kimana, Kuku, and Mbirikani Group Ranches in Loitokitok District, Kenya. The results can be clustered into socioeconomic, cultural, and environmental categories; however, they are all intertwined and cannot be discussed in a completely separate manner.

5.2 Socioeconomic and Cultural Impacts of Subdivision

When comparing and contrasting land use options, it is important to assess the effects that each option will have on community members’ livelihoods and other socioeconomic endeavors. In Loitokitok District, pastoralism and tourism are two major sources of revenue. Wildlife conservation is important for the health of biodiversity and for the wellbeing of the tourism industry. The community utilizes the natural environment for water, firewood, and other resources. It is important to keep grazing land and wildlife corridors open and unobstructed, so that wildlife can continue to live. If


68 Ibid.
wildlife does not thrive in and around a national park, then the park revenues will immensely decrease. Wildlife tourism is one of the most profitable land uses in the area and pastoralism is the livelihood strategy that allows it to flourish. In Kimana, subdivision has lead to more diverse land uses that are all more sedentary and environmentally destructive than pastoralism.

5.2.1 Development and Sedenterization

Increased investment in development is a side effect of land privatization.69 Although it is good for economies in the monetary sense, it is not sustainable for arid and semi-arid landscapes that house large amounts of wildlife. Farms and small businesses build fences, people require more food and water, and they compete with animals for space and resources. Increased population and sedentary structures leads to exploitation of resources, bush meat poaching, destruction of wildlife habitat and migratory corridors, and increased human-wildlife conflict.70

5.2.3 Land Sale

It has been stated that subdivision is inevitable, so the issue is no longer regarding the mismanagement of group ranches, but with the land sale and land use changes that are resulting from subdivision.71 The intention of group ranches was to increase productivity of pastoral land, minimize landlessness among Maasai, improve economic productivity of

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pastoralists, and reduce environmental degradation due to overgrazing. The group ranch system has failed to meet these goals and that has lead to a strong desire to subdivide.

Although privatization grants the owner rights to exclusion, investment, and transfer, it will fail to meet the same goals that were desired of the group ranch system. The major reason for this failure is due to the selling of individual land allocations. Land sale is beneficial for short-term profits and productivity, but does virtually nothing for long-term benefits. Most Maasai people have very little education (55% interviewed have no education and 32% have only primary schooling) and are therefore limited to the previously discussed livelihood strategies: pastoralism, agriculture, cultural tourism, and wildlife conservation. All of these livelihood strategies require land; so, once an individual sells their allocation, they lose the means to generate an income.

As shown in Figure 4.2, 75% of Kimana residents own less than 50 acres and most (38%) own less than five acres. Seeing as the carrying capacity for one animal is seven acres, this indicates that the land is being used for things other than pastoralism. The linear regression equation served to predict that likelihood that a group ranch resident will maintain the same land use post-subdivision.

5.2.4 Wildlife

Wildlife tourism plays a large role in Kenya’s economy; however, there was not a relationship between how subdivision will affect wildlife and voting preference (p=0.476). The community’s lack of consideration for wildlife can be attributed to several reasons. During every dry season, elephants, zebras, and gazelles that are looking for food wander into farms and destroy crops. Wildlife is also responsible for many human

72 Ibid.
injuries and deaths. Financially, there is no longer compensation available for livestock death from wildlife and the revenues generated from tourism are hardly ever invested back into the community so people have no incentive to preserve wildlife. Often times, cultural and wildlife tourism revenues do not make it back to the local community.

Out of the people who support wildlife conservation, 56% would not allow it on their land (p<0.001). More than half (55%) of those people would allow wildlife on their land if a financial incentive were available (p<0.001). It is clear that wildlife is a burden and a hazard to both human and economic safety. Wildlife cannot exist in islands so it is necessary that migratory corridors remain open. After subdivision, land uses, such as agriculture, will require the construction of fences that will cut off these corridors and be detrimental to wildlife. Group ranches are conducive to wildlife conservation because they allow for the seasonal movements required to maintain viable wildlife populations.

5.2.5 Livelihood Strategy Diversification

Pastoralism was founded with the intent of using vast seasonal movements to different areas of the landscape to water and graze livestock. Subdivision limits

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75 Ibid.


mobility and households are questioning whether or not individual land plots are economically viable. In response to this uncertainty, Maasai herders are varying their livelihood strategies whilst using pasture sharing to preserve some livestock keeping. They are diversifying their land uses, while preserving culture and tradition through maintaining limited pastoralism.

Pastoralism is a dominant livelihood strategy in arid and semi-arid landscapes like Loitokitok District. Sixty-six percent of the respondents practice pastoralism or agro-pastoralism. A majority of interviewees benefit from livestock keeping so it was surprising that 69% of people who believe that subdivision will negatively affect livestock keeping voted, or would vote, for subdivision (p<0.05). This demonstrates a strong desire to diversify livelihood strategies to more than just pastoralism.

After subdivision, many people plan to use their land for development (4%), conservation (7%), leasing to a conservation organization or to individuals (8%), and agriculture (36%). These are all land uses that are realistic for privately owned land plots; however, 10% of people plan to continue using their land for solely pastoralism and 21% for agro-pastoralism. Livestock keeping requires large tracts of land and the carrying capacity for one animal is seven acres. After subdivision, with the 60 acres that each member was allotted in Kimana, the carrying capacity for livestock was only nine animals. Nine livestock is not an economically viable herd. Even the people who want

79 Ibid.
80 Ministry of Livestock, personal communication.
to continue practicing only pastoralism will be forced to diversify their land use post-subdivision.

Throughout all of the key informant meetings, it was unanimous that subdivision will lead to a decrease in pastoralism. Less communal land equals less grazing land and therefore forces people to keep smaller herds. The youth key informants representing Kuku and Mbirikani said that subdivision would benefit agriculture and business, but pastoralists will likely have to change land uses. The Mbirikani Group Ranch official said that subdivision is bad for pastoralism and people who will sell their land, but beneficial for investments and agriculture. Thirteen percent of people who had a positive opinion of subdivision sited a type of development as the reason why.

5.3 Demographic Profile of the Successful Subdivided Group Ranch Resident

Now that it is clear what is happening to Loitokitok District and what that means for the future of the economy and environment, let us take a look at the future resident. The complete linear regression coefficients (Table 4.3) define an interviewee as 29.9% more likely to diversify their livelihood strategy if they are Maasai. This due to the fact that the majority of respondents were Maasai and it also shows that the future Loitokitok District will still be home to many Maasai.

The regression formula also shows that an individual is 21.2% more likely to diversify their land use if they voted for subdivision. This makes perfect sense because subdivision is a prerequisite for agriculture, small business, and land leasing. The people who supported subdivision from the beginning are likely to stay in the area and people

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82 Ibid.
who were not prepared for the need to diversify are likely to sell their land and move away.

An exception to the rule about people moving away if they do not want to diversify is in the case people who own many acres. Individuals who own enough acres to keep viable livestock herds are 32.3% less likely to diversify. In Kimana, there was strong statistical significance (p < .001) showing that those who own more acres are 27% more likely to stick with pastoralism. If they can make a living by practicing pastoralism on their land allocation, then it is likely that they will not sell their land, and even more likely that they will purchase more land. In the subdivided group ranches, pastoralism can still be a practical livelihood, but only in the case of wealthy landowners with a lot of property.

The last coefficient with a significant p value was about those who have attended, college, university, or a professional trade school. These people are 10.5% less to diversify their land uses post subdivision. Kimana had an even larger coefficient, meaning that its residents with a higher education are 76% less likely to diversify their livelihood strategy (p < .05). This is due to the fact that educated individuals are already practicing business endeavors and do not require a lot of land for their income. Subdivision may be insignificant to them on an economic level, as they are the outliers in this study.

Ultimately, the future resident of Loitokitok District will be someone with a diverse livelihood strategy. These land uses may include wildlife conservation, agriculture, pastoralism, small business, and land leasing. There may be a few large land plots where pastoralism is practiced, but it is likely that those households will incorporate
another form of income – even something as simple as a cultural tour of their land. The most sustainable land uses may not be the most profitable so it is important that a healthy ecosystem is a cultural norm in the community.

5.4 Suggestions

There was a consensus among the key informants from Mbirikani and Kuku (Table 4.5) that they should wait to subdivide until the youth are educated on the importance of land and the diverse effects of subdivision. Education and landowners associations are a good way to increase knowledge and involvement in the community. Subdivision has many negative potential side effects so education on the topic is a good idea.

In order to preserve the ecosystem and national parks, the majority of people need to allow wildlife on their land post subdivision. In order to accomplish this, a financial incentive should be supplied. However, even with that monetary enticement, 43% of the sample size would still not allow wildlife on their land. After subdivision, land owners will be allowed to lease the migratory corridors to stakeholders for a negotiated market value, thus acknowledging the cost and benefits of producing wildlife.\(^\text{83}\)

With privatization of land, it is necessary to assign monetary values to land and to the natural resources on that land. Some resources have a higher market value than others.\(^\text{84}\) This leads to certain plots of land being worth more than others. In Kimana, the only fully subdivided group ranch, the land near Amboseli National Park is being sold


and leased at a higher price than other land in the Group Ranch. This gives the owners of those parcels a higher incentive to sell. In Maasai culture, it is taboo to sell your land; however, in Kimana, roughly 25% of plots have already been sold.\(^8^5\) Figure 4.1 maps out the plots of land that have already been sold. It also illustrates the group ranch boundaries, wildlife sanctuary boundaries, and roads. The land near the boarder of Kuku Group Ranch is being sold at a high price because it is near the Nolturesh pipeline. Other land that is being sold at higher prices is near Amboseli National Park and near the roads.\(^8^6\) Land close to the Park can be easily leased or sold to safari lodges and conservation organizations.\(^8^7\) Land allocations need to be evenly distributed to maximize equal opportunity for all the Maasai.

In order to benefit the local Maasai, land should only be temporarily leased. It is a common perception that people are drinking away the money they received from selling their allocation.\(^8^8\) Anyone can sell land; however, people who are poor, drunkards, childless, in debt, or looking for money to invest are more apt to sell.\(^8^9\) Many respondents stated that they have sold or know people who have sold because of “family issues” or “money trouble.” The selling of land is an unfortunate side effect of subdivision.

The introduction of other tribes into Maasailand can have negative effects on cultural norms and land use practices. Kimana Group Ranch has not been subdivided

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\(^8^5\) Daniel Nina, personal communication.

\(^8^6\) Ibid.


\(^8^8\) Nice Kuya, personal communication.

long enough to fully gauge the effects of this; however, there has been increased agriculture since subdivision. Agriculture degrades the rangelands because it is not suitable for this type of arid and semi-arid landscape. If subdivision channels too much development and agriculture, otherwise know as diversification of livelihoods, then it will have serious effects on natural resources and on wildlife.

Ultimately, now is crucial for all of the group ranches. With the recent subdivision of the Kimana Group Ranch, and foreseeable subdivision of the Kuku and Mbirikani Group Ranches, group ranch residents are left with decisions to make about the possibilities of expanding into agriculture or other ways to diversify their livelihood strategies.

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