



*LUCID's Land Use Change Analysis as an Approach for Investigating Biodiversity Loss and Land Degradation Project*

**Links between Gendered Division of Labour and Land Use  
in Kajiado District, Kenya**

**LUCID Working Paper Series Number: 23**

By

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The Land Use Change, Impacts and Dynamics Project  
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## 1. Introduction<sup>1</sup>

Pastoral production systems all over the world are characterized by endogenously and exogenously driven change and can best be described as systems in transition. Nomadic pastoralists in South-western Iran have adapted to pressure from expanding human settlements and agrarian activity by modifying their land use and mobility patterns (Beck, 1998). In Niger, peanut production led to a neglect of subsistence production and a breakdown of existing social relations among the Fulani Pastoralists (Franke & Chasin, 1980). In North Africa, nomadic pastoralism was once the dominant form of land use (Steinmann, 1998), but it has steadily shifted towards more intensive agro-pastoralism in the second half of the 1900s (Bencherifa & Johnson, 1990). Crop-livestock integration is reported to occur more in lands historically used for pastoralism, the arid and semi-arid areas, than it does in other agro-ecological zones in Africa (Coppock, 1993; McIntire, Bourzat, & Pingali, 1992; Mortimore & Turner, 1991).

Within East Africa, drought, disease and competing land uses have accelerated the evolution of pastoral production systems from a predominantly migratory mode until the late 1800s to a more sedentary mixed crop-livestock system. Fratkin (1993) describes the transition in the production system of the Ariaal and Rendille pastoralists of Northern Kenya in the context of sedentarization and market integration. Waller (1993) describes changing interaction between Maasai and their neighbors with the creation of colonial state during the late 1800s. Campbell (1999) discusses recent changes in land tenure in Kajiado District and how these have impacted on Maasai pastoral production systems.

The dynamics of pastoral systems in transition have been summarized by Mortimore (1998) as land use intensification, economic diversification, institutional change and demographic transition. These categories have been shown to influence and impact on each other over time and space (Boserup, 1970; Turner, 1999; Winrock International, 1992). Transitions in pastoral production systems are an indication of changing society-environment relations. Transitions therefore raise concern about ecological degradation and challenges scientists to address the complexities of local-scale land use systems (Steinmann, 1998). There is a need to capture specific dynamics of the transitions, and particularly understand gender relations within changing production relations. Historically, pastoral societies have organized production around gender and age specific roles that can broadly be categorized into household tasks, livestock tasks and manufacturing tasks that include house construction, leatherwork and ornamentation (Fratkin, Galvin, & Roth, 1994). The trend towards crop-livestock integration is associated with new activities and a reorganization of gender and age specific roles. Niamir-Fuller (1994) explores the general changes in gender roles in livestock production in Africa, Latin America and Asia. She concludes that the changing pastoral production systems in Africa results in increasing workloads for women in Livestock production, a fact that is not well documented or recognized. Emerging gender divisions of labour are a direct consequence of struggles of men and women as they strive to support their families.

The relation between gender and environmental change need to be contextualized as a two-way process. As Leach et, al. (1995 p.5) state: “Gender relations have a powerful influence on how environments are used and managed and hence on patterns of ecological change over time. Yet environmental trends and shocks also impact on gender relations, whether directly – for example as ecological degradation alters the gender distribution of resources, or encourages particular coping strategies – or indirectly, in the political and ideological use of environmental issues to uphold or challenge particular relations or forms of subordination.” Understanding the two-way relationship between gender relations and environmental change

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<sup>1</sup> This paper is derived from a Ph.D. thesis by the author from the Department of Geography, Michigan State University

is of great importance to Kenya and other African countries facing similar people/environment pressures. One crucial area in the consideration of gender and environmental change is the difference in tasks and responsibilities in agricultural production. This study investigates relations between new gender division of labour and changing land use/cover patterns along the Mt. Kilimanjaro ecological gradient in Kenya.

The first part of this paper will explore theoretical frameworks for society-environment interaction studies. This will be followed by a brief description of the Kajiado District study area and methods used to collect and analyze labour data in the area. In the results and discussion section, the historical division of labour is discussed. I discuss how and why this has changed by presenting the current landscape of gender roles in crop and livestock production and explaining forces driving observed changes. The last part of the discussion looks at some of the ways in which the intra-household gendered division of labour is negotiated within the context of the study area.

## **2. Theoretical Frameworks for Society-Environment Interactions**

The relationship between society and the environment is a complex one. Various conceptual frameworks have been formulated to explain the relationship. On one extreme is environmental determinism, which sees societies as social organisms that diversify and specialize under the influence of the external environment. Scholars faithful to this tradition include the late 19<sup>th</sup> century sociologist Herbert Spencer, and early twentieth century scholars Ellen Churchill Semple and Ellsworth Huntington (Livingstone, 1992; Peet, 1998). On the other extreme, societies are seen to dominate and transform the environment. Whether the transformation is positive or negative remains a contentious issue. Neo-Malthusians follow the 1798 writings of Thomas Malthus and argue that there are finite limits to the ability of the earth's resources to support the demands of a large population (Ehrlich & Ehrlich, 1990; Hardin, 1968, 1974; Hardin, 1992; Homer-Dixon, 1999). Rapid population growth will therefore have a negative impact on the environment. In Kenya, population growth has been linked to migration into fragile ecosystems with subsequent serious environmental implications (Bilsborrow & Ogendo, 1992). In direct opposition to the neo-Malthusians, Boserup's work concludes that population stimulates agricultural innovation, and is therefore necessary for progress (Boserup, 1981). Tiffen et al. (1994) illustrate this view with an example from Machakos, Kenya. Neo Malthusian and Boserupian viewpoints are narrow, leading authors to propose simple measures of population control or adoption of new technologies as solutions to the complex problems of land degradation and poverty. Cultural ecology presents a broader picture by focusing on the evolution of cultural systems through environmental adaptation (Bates & Fratkin, 1999). Cultural ecology became popular in the late 1960s (Watts, 1983). A major critique of cultural ecology lay in its application of ecological principles of equilibrium and homeostasis to social life. "Peasant societies were adaptive systems just like any other biological population, and culture was posited as an ecologically functional attribute of the evolutionary demands of the environment" (Peet & Watts 1996 p. 5). Cultural ecology assumed societies to be homogeneous. Social differentiation based on age, class, gender, race, socio-economic status, etc affects access to and use of resources such as land and labour. This differentiation between groups is recognized within political ecology, which is one of the frameworks that have evolved out of cultural ecology.

Political ecology examines the society and environment interaction through an approach that includes interactive effects across different spatial and temporal scales (Blaikie & Brookfield, 1987). This perspective adopts the view that societies are heterogeneous, and that political and economic power affect resource allocation and use. It places the society-environment discussion in the context of the wider political economy (Harvey, 1996) and local histories. A considerable literature has developed to examine land issues within this framework (Peet & Watts, 1996; Rocheleau, Thomas-Slayter, & Wangari, 1996). Campbell and Olson's Kite

Framework (Campbell & Olson, 1991b) and Blaikie's Chain of Explanation (Blaikie, 1994) are examples of heuristic approaches that illustrate the political ecology approach.

Within political ecology, local land use and land cover change is related to state policies, interstate relations and global capitalism. For instance, the state has transformed pastoral lifestyles and land use and land cover by introducing boreholes in the arid and semiarid lands of Kenya and Botswana (Darkoh, 1996; Peters, 1984). Horowitz and Salem-Murdock (1987) have explored the socio-ecological impact of state-sponsored dam and mechanized irrigation works in Sudan. Warfare, international aid and watershed management are important interstate relations that influence land use and land cover. Recurrent warfare and endemic personal and group insecurity have social and ecological implications (Bryant, 1992). Northern states have facilitated socially and environmentally disruptive policies and practices in diverse Southern settings (Braidotti & International Research and Training Institute for the Advancement of Women., 1994; Rich, 1985). Waterbury (1979) illustrates how interstate relations associated with the Nile Basin resulted in hydropolitics that have socio-economic and ecological implications. Links between global capitalism and environmental degradation in the South have been extensively examined (Braidotti & International Research and Training Institute for the Advancement of Women., 1994; O'Brien, 1985; Watts, 1983). McCracken (1987) examines the link between colonialism and capitalism and the impact of the two on the ecology and people of East Africa.

A major shortcoming of the initial political ecology literature is that it did not give gender the prominence that it deserved. Political ecology drew attention to a land manager without asking who the land manager is (Blaikie & Brookfield, 1987). Gender is a critical variable in shaping resource access and control. Gender interacts with class, caste, race, culture, and ethnicity to shape processes of ecological change, the struggle of men and women to sustain ecologically viable livelihoods, and the prospects of any community for progress (Agarwal, 1997b). Political ecology also continues to focus on land at the expense of other resources such as labour. This is with good reason, given that most of the research based on political ecology has been on agrarian societies in less developed countries. Theories focusing on gender, environment and development evolved and addressed both shortcomings of political ecology.

Approaches linking women, the environment and development gained prominence after Ester Boserup (1970) documented the contribution of women in the productive sector of agricultural development in developing countries. Boserup's study brought out the dimensions and importance of gender within the development process. Three approaches linking women and environment will be discussed here; ecofeminism, feminist environmentalism and an approach coming out of political ecology, feminist political ecology. Ecofeminism was one of the early approaches linking women and the environment. Ecofeminists argued that women have a special relation to the environment because both have been oppressed by patriarchy and western culture (Shiva, 1988). The special relation has been defined by the intrinsic biological attributes of women (naturalism). Ecofeminists present women as a universally undifferentiated group masking differences based on class, age, ethnicity, caste, etc (essentialism). Essentialism and naturalism have been two strong critiques of ecofeminism. Critics called for an exploration of gender social relations, and a challenge to existing power structures within the modernization paradigm (Leach, 1994).

Feminist environmentalism challenges the arguments of natural and spiritual bonds with the environment put forward by ecofeminists. This approach is closely associated with Bina Argawal (Agarwal, 1992), who advocates for attention to the material circumstances that shape women and environment relationships. Researchers working in Africa have supported Argawal's argument (Carney & Watts, 1991; Leach, 1994; Schroeder, 1999). Women and men perform different but complementary activities that together contribute to the survival of their household. In many African societies, women are more involved in drawing water,



collecting firewood and growing food crops. This makes them more disadvantaged by degradation as there will be an increase on the demands for their labour. Argawal argues that it is this material concern and not any spiritual or natural connection that give women 'privileged environmental knowledge'. The special relationship between women and the environment has also been explained as a social construction (Rocheleau et al., 1996) that yields a privileged knowledge about the environment.

The feminist political ecology approach proposed by Rocheleau et al. (1996) seeks to address issues of gender, environment and development. The approach links feminist cultural ecology (Leach, 1994), political ecology (Blaikie & Brookfield, 1987), feminist geography (Townsend, 1995) and feminist political economy. Feminist political ecology brings a feminist perspective to political ecology and seeks to link local experience with global processes of economic and environmental change. Feminist political ecology recognizes gendered environmental rights of control and access as well as responsibilities to procure and manage resources for the household and the community. In addition, there is a gendered division of power to preserve, change or rehabilitate environments and to regulate the actions of others.

“Incorporating a feminist analysis within political ecology illuminates the ways in which gender positions both men and women vis-à-vis institutions that determine access to land, [labour,] to other resources, and to the wider economy. An ecological approach allows us to see environmental management, resource use, and technological change as a dynamic, interactive process... An emphasis on politics recognizes the social and political contexts in which national and international governments and development agencies... make policy. Linking gender with political ecology allows focus on the uneven distribution of resource access and control by gender, ...class ...and ethnicity” (Rocheleau et, al. 1996 p. 300).

Feminist political ecology has been successfully used in Africa to understand “relations in production” and “relations of production” (Carney & Watts 1990 p 217). Relations of production are critical in defining natural resource access (Rocheleau et al., 1996) and management (Campbell & The Women's Group of Xapuri, 1996). For example, gender analysis has shown that security of tenure may lead to higher investments in land, although people's ability to invest can be limited by a lack of resources vital to their survival (Bruce & Migot-Adholla, 1994; Mackenzie, 1995a). Relations of production are important in defining strategies for survival in harsh environments (Wangari, Thomas-Slayter, & Rocheleau, 1996), the nature of gendered acquisition and use of knowledge (Rocheleau et al., 1996) and the issue of land use conflicts in areas adjacent to wildlife conservation areas (Rocheleau, Schofield-Leca, & Mbuthi, 1995).

Relations in production explain labour processes and show that development intervention, environmental transformations and new markets puts new demands on labour and new values on resources, bringing about new gender conflicts. Carney shows how irrigated rice farming transformed property and labour relations between husbands and their wives in the Gambia (Carney, 1992; Carney, 1996). Struggles in rice production include women reaffirming claims to a portion of the surplus. When this is denied they refuse to work on the households farm, preferring to sell their labour in the market. Schroeder (Schroeder, 1993; Schroeder, 1999) and Schroeder and Suryanata (1996) show how developers at different levels rely on the mobilization of unpaid female labour. In the Gambia, male landowners embraced tree growing once they were able to take advantage of unpaid female labour for the care of the trees. This brought about dual conflicts over labour and over space, as women destroyed/neglected the men's trees because they cast shadows over the women's vegetables limiting growth (Schroeder, 1999).

Of the above theoretical frameworks, the author most closely identifies with feminist political ecology and feminist environmentalism in understanding the dynamic context of Kajiado

District. Men and women's labour processes have the ultimate goal of household survival, which guides decisions on what gets done, when it gets done and by who. Intra-household land use options and labour allocation decisions are therefore related to material concerns of the household. Land use and labour allocation decisions are made within the context of intra-household power differentials between husbands and their wives. This presents gendered struggles over land use options and labour processes, which become visible through gendered landscapes. For example, in the irrigated zone, men's labour dominates cash crop production, and men's crops occupy parts of the family farm that have more favourable moisture regimes (the floor of irrigation basins). Women's food crops are planted in areas with less favourable moisture regimes (on the elevated ground between irrigation basins).

### 3. Research Questions

The main objective of this study is to investigate the relationship between gender division of labour in crop and livestock production and changing land use/cover patterns along the Mt. Kilimanjaro ecological gradient. The study seeks to answer the following research questions:

- (1) What is the historical division of labour and how was it related to land use?
- (2) How has the division of labour changed over the past seventy years?
- (3) How and why does the division of labour vary by agro-ecological zone?
- (4) How does ethnicity influence gender division of labour?
- (5) Why has the division of labour changed?
- (6) How is the gendered division of labour negotiated in the context of the changing land use systems?

### 4. The Study Area

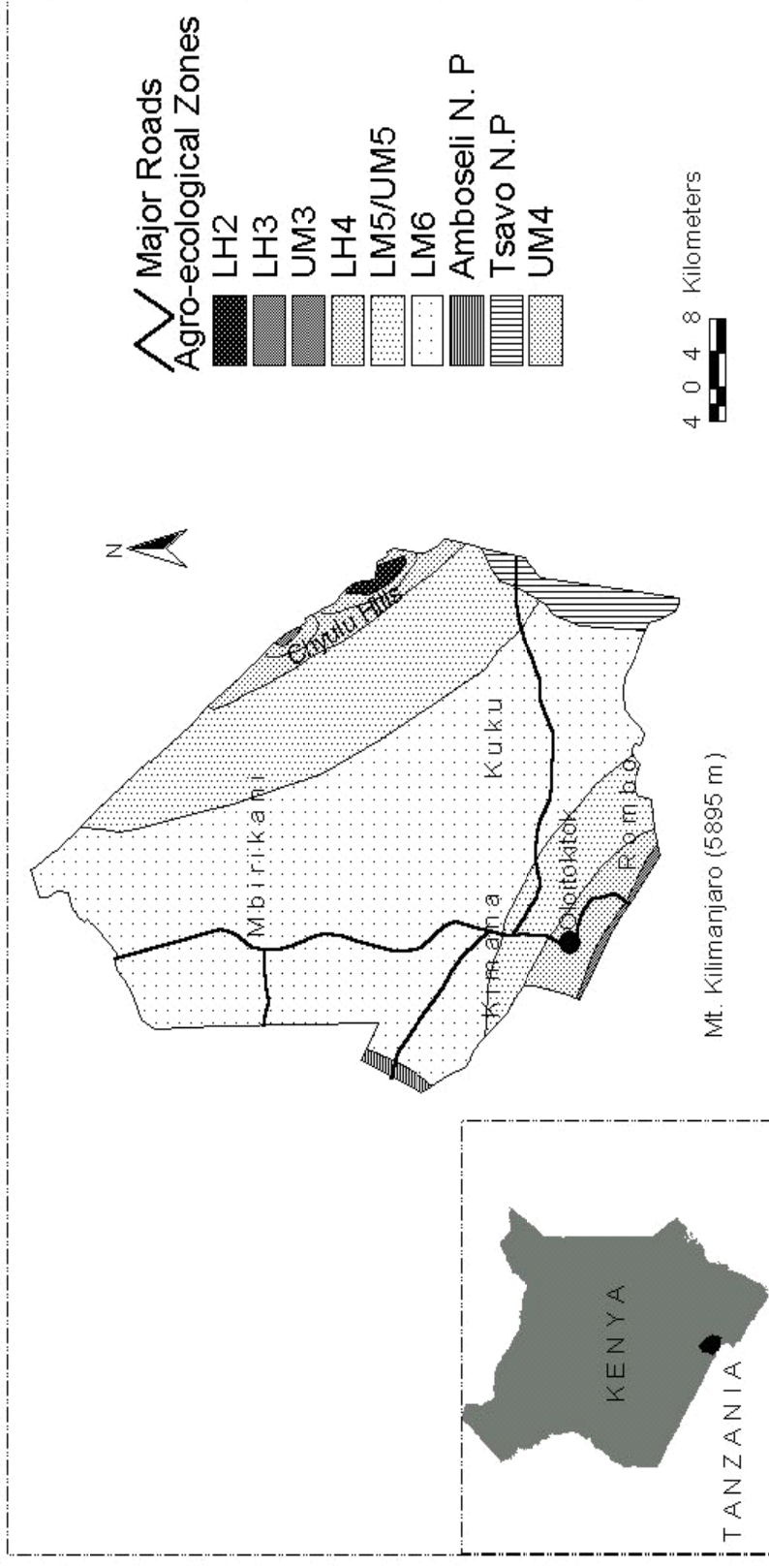
The study is located in Oloitokitok Division of Kajiado District, Kenya (Figure 1).<sup>2</sup> It lies on the Mt. Kilimanjaro ecological gradient, and covers seven agro-ecological zones, LH2, LH3, UM3, UM4, LM5, UM5 and LM6. The rainfall amounts and reliability of each agro-ecological zone are summarized in Table 1. Agro-ecological zones (in the tropics) are defined by moisture supply and are differentiated by soil types, in order to provide a framework for the ecological land use potential of an area. The letter part of the agro-ecological zone names represents "temperature belts", defined by the temperature limits of the main crops in Kenya. The number is the "main zone" and it represents a combination of precipitation and evaporative demand of the atmosphere, taking into consideration the length and intensity of arid periods (Jaetzold & Schmidt, 1983). Table 2 summarizes the ecological land use potential of the agro-ecological zones of Oloitokitok Division.

**Table 1.** Rainfall Distribution and Reliability

Agro-Ecological Zone	Average Annual Rainfall (mm)	60% Rainfall Reliability <sup>1</sup>	
		First Season	Second Season
LH2	1000-1100	250-350	450-500
LH3, UM3	800-1000	200-300	320-450
UM4	650-900	160-200	250-380
UM5, LM5	400-720	140-180	130-260
LM6	300-450	100-150	100-150

<sup>1</sup>Amount surpassed in 6 out of 10 years  
Source: Jaetzold and Schmidt (1983)

<sup>2</sup> This paper refers to "Oloitokitok" Division, now known as "Loitokitok" Division in governmental and other publications.



**Figure 1.** Map of Oloitokitok Division, Kajiado District

**Table 2.** Characteristics of Agro-Ecological Zones in Oloitokitok Division

Agro-Ecological Zone	Rainfall/ Evaporation Ratio (%) <sup>1</sup>	Description <sup>2</sup>	Ecological Potential <sup>2</sup>	Actual Land-Use/Cover <sup>3</sup>
LH2	65-80	Sub-humid lower highland zone. Annual mean temperature 15-18 C. Mean min temp 8-11 C	Wheat/maize, pyrethrum zone	Forest,
LH3	50-65	Semi-humid lower highland zone. Annual mean temp 15-18 C. Mean min temp 8-11 C	Wheat/maize, barley zone	maize, beans, stall-fed
UM3	50-65	Semi-humid upper midland zone. Annual mean temp 18-21 C. Mean min temp 11-14 C	Marginal coffee zone	livestock
UM4	40-50	Transitional upper midland zone. Annual mean temp 18-21 C. Mean min temp 11-14 C	Sunflower/maize zone	Maize, beans, Stall-fed livestock
UM5	25-40	Semi-arid upper midland zone. Annual mean temp 18-21 C. Mean min temp 11-14 C	Livestock-sorghum zone	Maize, beans, horticulture
LM5	25-40	Semi-arid lower midland zone. Annual mean temp 21-24 C. Mean min temp > 14 C	Livestock-millet zone	stall-fed livestock, ranching
LM6	15-25	Arid lower midland zone. Annual mean temp 21-24 C. Mean min temp > 14 C	Ranching zone	Maize, horticulture, ranching

<sup>1</sup>Compiled from Sombroek et al. (1982)

<sup>2</sup>Compiled from Jaetzold & Schmidt (1983)

<sup>3</sup>Source: Author's fieldwork

In the tropics, moisture availability rather than temperature is the more important factor limiting crop growth (Jaetzold & Schmidt, 1983; Pratt & Gwynne, 1977). Not surprisingly, the actual land use pattern in Oloitokitok is very strongly defined by rainfall patterns. Rainfall follows a bimodal pattern, with 45% of the rain falling between October and December and 30% falling between March and May (SARDEP, 2001). Most of LH2 falls under the jurisdiction of the Forest Department and is not available for crop farming. LH3, UM3, and UM4 have enough moisture available to support rain-fed farming. In periods of good rainfall, UM5 and LM5 also receive enough moisture to support rain-fed agriculture. UM5 and LM5 are also important for irrigated agriculture where springs or rivers are present. LM6 is too arid to support rain-fed farming. Crop farming in this zone is only possible through river or spring irrigation. The physical description of the study area below is based on these broad actual land use patterns rather than by the potential land use zones defined by agro-ecological zones.

*The Rain-Fed Zone:* The physiography of this zone consists of the volcanic ridges and uplands of Mt. Kilimanjaro, with an altitude ranging from about 1400 to about 1950m. The zone receives an average annual rainfall of 700-1000mm (Jaetzold & Schmidt 1983). The soils in this zone have developed on Tertiary basic igneous rock. They are predominantly nito-chromic and eutic cambisols. They are well drained, shallow to very deep and have moderate to high fertility (Sombroek, Braun, & van der Pouw, 1982). The ground water level is moderately deep to very deep (70-250m) (SARDEP 2001). The area is also drained by several permanent rivers, and it is the source of the Nolturesh pipeline that serves other

divisions in Kajiado District and parts of Machakos District. In broad terms, the vegetation of the study area is closely related to agro-ecological zonation. Human land use also contributes to define the vegetation associations observed in the study area. Apart from a small forested area at the Kenya-Tanzania border, the non-farmed areas of the rain-fed zone are covered by woodland with *Chloris roxburghiana*, *Themeda triandra* and *Commiphora africana* vegetation associations (Republic of Kenya, 1990).

*The Mixed Rain-Fed and Irrigated Zone (The Mixed Zone):* Physiographically this zone consists of the lower volcanic ridges and uplands of Mt. Kilimanjaro. The zone rises from about 970m to about 1700m above sea level. The mixed zone receives an average annual rainfall of between 400 and 720mm (Jaetzold & Schmidt 1983). Two broad soil categories can be found in the mixed zone. On higher elevated areas the soils are similar to the soils found in the rain-fed zone. Lower grounds have an association of chromic luvisols and verte-luvisols, soils that have developed on basic igneous rocks. Luvisols are well drained, deep to very deep while phaeozems are imperfectly drained deep to very deep saline and sodic clays. Both soil types have moderate to low fertility (Sombroek et al. 1982). Surface streams originating in the rain-fed zone drain the mixed zone. In addition, the zone is served by several springs where ground water table reaches the surface. The mixed zone is dominated by bushed grasslands, with wooded grasslands occurring in areas where ground water is available. The dominant vegetation association in this mosaic consists of *Pennisetum mazianun*, *Lintonia nuntans* and *Commiphora africana* (Republic of Kenya 1990).

*The Irrigated Zone:* Piedmont plains dominate the plains in this zone, with lacustrine plains close to Lake Amboseli. The altitude ranges from 910 to 1310m. The rainfall received in this zone is between 300 and 400mm per annum and not sufficient for rain-fed agriculture (Jaetzold & Schmidt 1983). The major soil types in the mixed zone extend into the irrigated zone. In addition, there are orthic solonchaks and orthic solonetz soils that have developed on the lacustrine plains and gleyic solonchaks on the swamps. They are a complex of moderately well drained to very poorly drained soils. Their depth ranges from shallow to very deep. They are strongly calcareous, strongly saline and strongly sodic, and usually found in swampy areas. They have moderate to low fertility. The irrigated zone also has pellic vertisols of variable fertility on bottomlands. These are imperfectly drained, very deep, slightly to moderately saline, moderately sodic and in many places calcareous. On the piedmont plains are calcic cambisols that developed from tertiary/quaternary volcanic rocks. They have moderate to high fertility, are well drained, moderately deep to very deep with slightly saline and sodic deeper subsoil (Sombroek et al. 1982). Surface streams and springs provide water for irrigation in this zone. The irrigated zone has vegetation associations similar to those found in the mixed zone in areas where ground water is available. On the drier areas there are grassland vegetation communities. Important grassland species are *Digitaria macroblephara*, *Sporobolus fibriatus* and the invader species *Ipomea kituensis*, which can be found on degraded pasture (Republic of Kenya 1990).

The 1999 population census shows the population of Oloitokitok Division to be diverse, but dominated by the Maasai people. The Maasai people have undergone a lot of change in the past 150 years. In the mid 1800, the Maasai inhabited a large area stretching from the north of Lake Turkana (currently Southern Ethiopia) to central Tanzania (Galaty, 1993a). Livestock played an important role in the life of the Maasai. Livestock provided food and a livelihood, it was a source of power and prestige related to wealth. During the wet seasons, the Maasai grazed their livestock on the rift valley floor. In the dry season, the well watered highlands east of the rift valley provided water and pasture. The Maasai had close associations with their neighbours, especially the Kikuyu, with whom they had trade associations. Sometimes during periods of extreme drought when the Maasai lost much of their cattle, they took up crop farming among the Kikuyu (Waller, 1993). Maasai and Kikuyu identity was fluid and could be changed through intermarriage or raids and return raids (Galaty, 1993b).

Huntington (1953) estimates that by the 1870s, the Maasai were at the height of their political and territorial powers. They numbered about 500,000 (Kjekshus, 1977). In the 1880s and 1890s, a rinderpest outbreak that swept through most of East and Southern Africa (Lovemore, 1997) combined with contagious bovine pleuro-pneumonia and reduced Maasai livestock numbers by 80% (Huntingford, 1953). At about this time human cholera and smallpox reduced the numbers of the Maasai considerably. These diseases coincided with the period of European colonization of Africa and more Maasai died fighting British occupation of their territory. It is estimated that by the early 1900s only about 40,000 Maasai survived (Kjekstius 1977).

The British alienated land for their settlement using a series of treaties. In 1904 the British government created two native reserves in which they confined the Maasai. The Northern Reserve comprised of Laikipia and Samburu and the Southern Reserve stretched from the Ewaso Ngiro River to Mau Narok (roughly present day Kajiado and Narok Districts). By 1911, the Northern Reserve had been abolished and its residents moved to the Southern Reserve. In 1912, an agreement was made that required the Maasai to stay within the reserve, an area of about 38,000 square kilometres (Lindsay, 1987). These confinements resulted in the loss of important grazing lands for the Maasai, land which had been particularly valuable in periods of extended drought. Confining the Maasai to reserves also cut them off from their trading partners (Campbell, 1986; Campbell & Migot-Adholla, 1981; Campbell & Olson, 1991a).

The official colonial policy was to exclude aliens from the Maasai Reserves and to remove Kikuyu who were in the Reserve (Kenya, 1927). This was problematic because some Kikuyu were already in the reserve when it was created and they were regarded as assimilated Maasai or “adoptees” (Waller 1993). They were a product of long term association between the Maasai and Kikuyu through intermarriages and trade. Some had been recent migrants driven by the pressure in the Kikuyu Reserves and a demand for labour and cultivating wives in the Maasai reserves (Waller 1993). Some Maasai were beginning to establish semi-permanent homes and crop farming. They married Kikuyu women who knew how to cultivate crops. Some Kikuyu who came into the Maasai reserve at about the same time were however neither adoptees, nor were they seeking to be assimilated (Kanogo, 1987). They obtained share-cropper, tenant, or squatter status (Waller 1993).

After independence, a combination of forces drove the transitions in Oloitokitok Division. The first was an increase in the population of the division. The population in the division increased from 6,168 in 1948 to 95,430 in 1999 (Kenya, 1950; Republic of Kenya, 2001a). This is a 1,447% change, three times higher than the national average of 446% during the same time period. Population increases were more a result of migrations into the division than natural increase. Forty seven percent of the respondents were born outside the division. Although most of the non Maasai living in the study area today are of Kikuyu origin, there are also people from the Kamba, Luo, Luhya ethnic<sup>3</sup> groups as well as people of Tanzanian origin. Table 3 below shows the trend in ethnic composition in Kajiado District between 1962 and 1989.

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<sup>3</sup> Throughout this paper, the ethnicity of a person is taken to be that which they personally assign themselves

**Table 3.** Ethnic composition in Kajiado District between 1962 and 1989<sup>4</sup>

Ethnic Group	1962		1969		1989	
	Number	% of total	Number	% of total	Number	% of total
Maasai	53,219	79	58,961	69	146,268	57
Kikuyu	6,233	9	16,258	19	61,446	24
Kamba	3,975	5	4,321	5	20,755	8
Luo	1,023	2	1,612	2	8,084	3
Luhya	1,269	2	1,166	1	5,416	2
Others	1831	3	3,585	4	16,710	6
Total	67,550	100	85,903	100	258,679	100

Source: (Republic of Kenya, 1964, 1970, 1994)

Migrations of Kikuyu described above continued and were accelerated by changes in land tenure. Land tenure was in the process of being transformed from communal to individual by the government. The trend was to subdivide the land into individual ranches and farms. The first individual ranch was allocated in Kajiado District in 1956 (Ayuko, 1981). The Maasai further subdivided and sold these farms on a willing seller willing buyer basis. The buyers were in most cases migrants from the Kikuyu community, who had heard of land availability from their kin who had settled in the division earlier. Because there wasn't enough land for every member of the Maasai community to get a viable individual ranch, group ranches were established by an Act of Parliament (Group Representative Act of 1968) and group ranches were demarcated in the drier zones (the mixed zone and the irrigated zone). Group ranches are large pieces of land that are owned and used jointly by their members. Kajiado District has a total of 27 group ranches. Fifteen of them were established in Livestock Development Phase 1 (1969 to 1974) and the rest in Livestock Development Phase 2 (1975 to 1981) (Olang, 1982). More recently, there has been a push, coming from the sons of those who had initially obtained membership of the group ranches to subdivide the ranches into individual units (Campbell, 1993). Ole Simel (1999) and Ntiati (2002) detail some of the challenges that accompany the group ranch subdivision process in Kajiado District.

Another important occurrence in Oloitokitok Division was the introduction of protected areas during British colonial rule. This was part of a rising environmental concern in the United States of America and Europe, that saw the establishment of national parks and game reserves in the United States and Africa by 1908 (Western & Wright, 1994). This environmental concern combined with the rise of preservationism as a paradigm for conservation. This translated into the establishment of a Game Reserve in Southern Kenya, between Nairobi and the border with German East Africa (present day Tanzania) in 1899. The reserve was gazetted in 1906 (Lindsay 1987). In 1933, the convention on wildlife preservation in British colonies was signed, following which a number of National Parks were established. The large Southern Game Reserve was abolished in favour of three smaller National Reserves, one of which was the Amboseli National Reserve, in Oloitokitok Division. This reserve covered an area of approximately 3260 km<sup>2</sup> surrounding the Amboseli basin (Lindsay 1987).

After independence in 1963, a series of negotiations between the government, conservationists and resident pastoralists was set in place, culminating in the establishment of Amboseli National Park (488 km<sup>2</sup>) which was gazetted in 1974 (Western, 1982). At the time, there were plans to provide Maasai pastoralists compensation and alternative watering options for their livestock. Today however, many of them feel disillusioned as many promises that came out of the lengthy negotiations did not benefit all the members of the community equally. There are continuing conflicts between the local communities and wildlife over crop damage and transmission of disease from wild animals to domestic animals (Campbell, Gichohi, Mwangi, & Chege, 2000; Western, 1982).

<sup>4</sup> Data on ethnicity for the 1999 Kenya Population Census has not been released

Other changes in Kajiado District include an increase in the level of social services provision, but a lack of good roads. Schools and medical centres in Oloitokitok Division have been increasing since independence. Recently, the number of elementary (pre-primary and primary) schools has increased from 106 in 1997 to 153 in 2000. Elementary school enrolment almost doubled between 1997 and 2000, from 10,747 to 19,646 (Dept of Education, Kajiado 2000). Oloitokitok has 24 health provision centres, which is higher than the district average of 19 per division (SARDEP 2001). There is one major road in the division running north-south and connecting to the Nairobi-Mombasa Road. None of the roads (main and feeder) are tarmaced and many become impassable during the rainy season. The major road falls into frequent disrepair, making transportation time and monetary costs to and from the district high.

Many of the processes outlined above have led to a change in the value attached to land and a shift from a livelihood dominated by grazing to one with mixed crop-livestock systems. Some areas of highland forest have been brought under Rain-fed farming. In the rangeland, irrigated agriculture is practiced using spring and river water. Table 4 presents the general patterns of land use and land cover change in the study area based on the interpretation of satellite imagery.

**Table 4.** Land use and land cover change in SE Kajiado

Land use/cover type	Area (Ha)			
	1973	1984	1994	2000
Forest	646	596	417	417
Irrigated agriculture	245	3513	4045	4768
Rain-fed agriculture	7213	17762	22034	24911

Source: Campbell, et, al. (2003)

Horticultural products, most notably onions and tomatoes dominate the irrigated areas, while maize and beans dominate the rain-fed areas. Irrigated crops are grown principally for sale outside the division. Mombasa and Nairobi are the two most important destinations for Oloitokitok horticultural produce. Campbell's 1996 fieldwork also identifies European markets as one of the destinations of Oloitokitok produce (Campbell et al., 2000).

These changes in land use patterns have repercussions for gender roles. Gender is important in defining resource use and access, including the labour resource. Women's unequal access to land and to credit, their relation to property, and the cultural norm of intra-household division of labour and food allocation are just some of the factors that have been compounded by changing socio-economic and political circumstances. Explicit attention to gender has not been done in any part of Kajiado District. For instance, the Kenya Government does not mention gender while defining development policy in Kajiado District (Republic of Kenya, 1994b). There is a need to investigate rural labour, its gendered division and its relation to land use and resource management in Oloitokitok Division of Kajiado District, Kenya. The information obtained will help policy address land use issues in a more comprehensive way. In particular it is important to investigate to what extent gendered division of labour resembles or deviates from labour sharing patterns examined elsewhere in Africa (Guyer, 1981; Idowu, Guyer, & University of Ibadan. Women's Research & Documentation Centre., 1993), and how control for the labour resource is negotiated between husbands and their wives in the context of Oloitokitok Division. It is also important to investigate how gender division of labour evolves when pastoralists move into crop-livestock production systems.



## 5. Methods of Data Collection and Data Analysis

### 5.1 Data Collection

A combination of household interviews, key informant interviews focus group discussions and participant observation were used to collect data on gendered division of labour and land-use. Data were collected over a period of ten months beginning March 2001.

The household interviews involved the administration of a structured questionnaire in 351 households selected based on a stratified random sample design. Stratification was based on agro-ecological zonation. Data were collected in four agro-ecological zones, LH3/UM3, UM4, LH5/UM5 and LM6. Following Bernard's, recommendation, the study pre-tested the questionnaire in 35 households that were later excluded from the actual study (Bernard, 1995). In each zone names of all the farming household heads were collected and those to be interviewed were randomly selected from this list. Because the objective was to do a gendered comparison, the study interviewed the husband and one wife in each household. In cases where the man had multiple wives, the woman who was resident in the household selected for the study was interviewed. We also carried out interviews with women who were heads of households<sup>5</sup>. Table 5 below summarizes the number of people interviewed in each agro-ecological zone.

**Table 5.** Number of respondents in the household survey

Agro-ecological Zone	Husbands	Wives	Female heads of households	Total
LH3/UM3	58	59	16	133
UM4	78	79	18	175
LH5/UM5	72	71	13	156
LM6	81	83	11	175
Total	289	292	58	639

Source: Author's fieldwork

Key informant interviews were continuously held during the length of the study. The interviews were concentrated at the beginning of the research, as they helped the researcher to design an efficient survey tool and focus group discussions. Key informants included local teachers, chiefs, group ranch officials, agricultural extension workers and local elders (junior and senior elders) and other inhabitants of the study area. The interviews were semi-structured, and the content varied depending on the field of expertise of the key informant. Key informants were asked questions on gender roles, land use, property rights, how these had changed and why they had changed. Gender, age, education wealth and ethnicity were considered when selecting key informants to ensure that the information obtained was representative of the community.

Focus group discussions have been recognized as an important data collection tool, especially where there are serious time constraints. They enable an outsider to quickly understand the range of perspectives in a community (Slocum, Wichhart, Rocheleau, & Thomas-Slayer, 1995), and at the same time give respondents an opportunity to learn from each other. Focus group discussions were led by a facilitator (the researcher) and each had 10 to 15 people invited to attend as recommended by Slocum et al. (1995). A total of 9 focus group discussions were held. Three of these were held in the Rain-fed zone (LH3/UM3 and UM4 agro-ecological zones), 3 in the mixed Rain-fed and irrigated zone (LH5/UM5) and 3 in the irrigated zone (LM6). Each of the three meetings held in each zone discussed a different topic: (1) a discussion on gender division of labour by men only, (2) a discussion on gendered division of labour by women only (3) a discussion on forces driving land use change in the past fifty years by both men and women. Single gender focus group discussions on gender division of labour were preferred as women in the cultural context of the study area are

<sup>5</sup>For the purposes of this working paper, data from female headed households has not been used

uncomfortable divulging this information in the presence of men. This was not expected (and neither was it observed) in the discussion on forces driving land use change and we therefore held mixed gender meetings. The meetings were small enough that everyone who attended had several opportunities to speak. The objective of the focus group discussions was to add explanation to the data collected in household interviews. Because not everyone could attend, participants were carefully selected so that ethnicity, age, level of education and gender (in the case of the discussion group on forces driving land use change) were well represented. Focus group discussions were designed to follow up on specific issues that came out of the household survey and participant observation, for this reason, care was taken to select people based on their competence and knowledge of land use issues. A decision on who to invite was arrived at after discussions with local extension officers, and other local residents, and it incorporated the researcher's own knowledge of the people of the study area since it was done towards the end of the study. The author realizes that by their nature, focus group discussions are not statistically representative of the population. Group meetings in general can introduce biases when sections of the population (usually the young and the women) fail to present their views (Campbell, 1987). This was not a major concern here because the issues under discussion had arisen out of the household survey, which was designed to be representative of the population, and because of the decision to hold separate men and women meetings. All the meetings were tape recorded and later transcribed and translated into English.

## **5.2 Data Analysis**

Data collected during the household survey were entered into ACCESS and analyzed in SPSS and EXCEL packages. To analyze labour-time allocation, hours spent on different crop and livestock activities per person per season were calculated. To capture gender differences, a comparison was made between the time spent on different activities by husbands and their wives. A matched pair two tailed t-test (95% confidence limit, unless otherwise stated in the results section) was used to test for significance. Comparisons between Maasai and non Maasai ethnic groups were made, to see if ethnicity affects gender roles. In this case we used an independent two tailed t-test to test (95% confidence limit unless otherwise stated in the results section) for significance. The independent t-test was preceded by the Levene's test for equality of variance. From the results of the Levene test, the independent t-test that was run met the assumption of equality of variance. In all cases comparisons between different agro-ecological zones were made to capture variation along the ecological gradient<sup>6</sup>

## **6. Gendered Division of Labour and Land Use Change**

This section starts with a discussion on the organization of gender roles in a historical context. The section then goes on to analyze how these have changed and how time allocation in both crop and livestock production differs between ethnic groups. The last part of this section investigates the reasons behind the observed changes in gender roles and how gender roles continue to be negotiated within the household. Throughout this section, LH3/UM3 and UM4 are sometimes jointly referred to as the Rain-fed zone.

### **6.1 Historical Division of Labour and its Relation to Land Use**

Discussion on the historical division of labour between men and women will use the 1930s as a starting period. This does not imply that prior to the 1930s the labour roles were static. The author is aware that societies are not static, and intra-household gender roles evolve as part of changes in the wider society. The author chooses the 1930s as the point of entry because this is the period of initial crop cultivation in the study area (Campbell, 1986). The 1930s fall within the period after colonial occupation and before significant amounts of crop cultivation. In the SE Kajiado context, this period can be thought of as a period of labour under-utilization, especially among men. This is because it is essentially male labour time that was

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<sup>6</sup> It should be noted here that even though we analysed our data based on gender, ethnicity and ecology, we understand that none of these factors act in isolation. The differences that we observe are as a result of a combination of all three factors (among others) and their historical and geographical interactions.

modified by colonial policies that limited or banned hunting, raiding and fighting (Kitching, 1980).

The study area lies in Maasai country and from field observation and information obtained from key informants, is principally occupied by the Ilkisongo Maasai. The area is also occupied by non Maasai people from agricultural communities of Kenya and Tanzania. As explained in chapter 3, non Maasai are recent migrants who have brought with them their agricultural skills, techniques and labour organization. This section will focus on the Maasai historical division of labour and not on the historical division of labour in non Maasai communities for three reasons. First, it is the Maasai who have undergone the more recent change in livelihood patterns that have affected their labour organization. The non Maasai communities in the study area practiced mixed crop-livestock agricultural farming before they migrated into Oloitokitok Division. They have not undergone recent changes in their labour organization to the same extent as the Maasai have. Secondly, it is the Maasai who are historically and geographically tied to the study area. Land use and land cover changes described in chapter 5 have occurred in areas that were historically used by the Maasai. Thirdly, the Maasai make up the single largest ethnic group in the division.

In the mid 20<sup>th</sup> century, the Maasai followed a nomadic herding political economy that was confined in the Southern Maasai Reserve. Activities involved in nomadic herding were clearly defined by gender and age-set roles (Spencer, 1993; Talle, 1988/1994). Land was communally used for grazing. Key informants said that the area was more vegetated than it is today. The highland forest was more extensive than it is today and in the lowlands, tree density was higher than it is now. Herders mainly used the lowlands for livestock grazing, leaving the better watered highlands reserved for grazing during the long dry seasons. Key informants said that tsetse flies and ticks also contributed in keeping herders away from the lower highlands (agro-ecological zone 5) except in periods of prolonged dry seasons.

The daily work of tending livestock was assigned to uncircumcised shepherd boys (*ilaiyok*). They were joined by the circumcised young males (*ilmurran*) when going to water places (Mitzlaff, 1994). During the rainy season, livestock were grazed and watered close to the bomas, and in some cases very little supervision was required. Herders told us that sometimes all they did was “open the animal sheds in the morning and count the livestock in the evening”. Old and young males had plenty of leisure time during the rainy season. Their work increased during the dry season when they walked longer distances to their dry season water sources and pastures. During these times, tending of livestock was transferred from the *ilaiyok* to the *ilmurran* (Mitzlaff, 1994). In periods of prolonged drought, the *ilmurran* would migrate with the livestock for a period of up to several months to the well watered highlands such as the Chyulu Hills and the Nguruman escarpment. The *ilmurran* also built and repair the thorn fences of the livestock sheds (Mitzlaff, 1994).

The elders did not engage in manual work, unless they were very poor (Mitzlaff, 1994). Elders were responsible for managing issues of public interest. They officiated disputes (marriage, criminal, etc) and made resolutions. Their role in day to day activities was mostly leadership and supervisory. For example, adult men attended milking, mostly to ensure that women did not over milk the cattle (on average women milked two teats for human consumption and left two teats for the calves to suckle) (Talle, 1988/1994). An elder was also responsible for the management of his herd, including his wife's (or wives') and children's livestock (Mitzlaff, 1994).

The life of female members of the community was concentrated around their bomas. They were responsible for house construction, cleanliness, food preparation and sharing, reproduction and care giving. Livestock related activities included milking, looking after the young and sick animals (Hodgson, 2001) and sweeping the animal sheds. Upon marriage, a woman was assigned a number of milk cows and small stock which she was not allowed to

sell or slaughter, but could give as a gift (Mitzlaff, 1994). Women were in charge of handling and management of milk and milk products (sour milk, butter fat), a fact that gave them a key role in the household (Dahl, 1979; Hodgson, 2001; Talle, 1988/1994). Livestock allotted to a house were milked by the woman of the house and her older daughters. The cows were milked twice a day, before grazing in the morning and after grazing in the evening. After milking, the woman kept the milk inside her house where it was further prepared or consumed. Milk management gave the woman substantial decision making power within the household. She was free to dispose of the milk as she wished. She could exchange it for cash or labour or use it to build goodwill and reputation with her female friends and relatives (Talle, 1988/1994). This was not unique to the Maasai, rather it was true in other pastoral communities as well (Dahl, 1979). Their role as milk managers put women in charge of the young livestock. When apportioning the milk, a woman had to make sure that the young animals received sufficient for their nutritional needs. Women milked a proportion of the milk from an animal and then brought its young to suckle the rest. Women therefore brought the young to their mothers twice a day, allowed them to suckle and then took them away from their mothers after they suckled (Mitzlaff, 1994). Older girls helped their mothers in milking and feeding the young animals. Livestock activities took more of the women's time during the rainy season than during the dry season because livestock produced more milk during the rains. The livestock were also more susceptible to disease attack (sheep especially) then, and their sheds had to be cleaned out more frequently to keep them as dry as possible.

Important activities related to cleanliness and food preparation were gathering firewood and fetching water. These were done by women and girls. Women in focus group discussions said that this was not very difficult at the time as water was more easily available from the rivers and good quality firewood was more widely accessible. The women and girls also made calabashes for milk storage, prepared snuff, worked the skins of slaughtered animals and made leather clothing for their families and decorated these with beads. The Maasai were first introduced to glass beads at the turn of the century (Talle, 1988/1994) and ever since they have spent time making bead and leather work. They decorate milk calabashes, clothes and make colourful ornaments such as bracelets, belts, necklaces and earrings. Ornaments are given as gifts to other women and men, usually to cement a good relationship. Women were also responsible for house construction and maintenance. This was especially difficult during the rainy season because the women had to ensure that the house did not leak (Mitzlaff, 1994), and this took considerable time and effort.

## **6.2 Changes in land use and implications for the traditional division of labour in crop and livestock production**

As noted earlier, initial cultivation started around the 1930s (Campbell, 1986). It was however after the second world war that the amount of cultivation in the Oloitokitok area began to increase (Campbell, 1981). At this time, cultivation was practiced by non Maasai government officers posted at the Oloitokitok office. After the declaration of the State of Emergency in 1952, most non Maasai returned to their native homes and the area under cultivation reduced (Campbell & Migot-Adholla, 1981). Non Maasai returned to Oloitokitok and surrounding areas after independence, with the vast majority moving in between 1966 and 1976 (Campbell, 1981).

The earliest land use map available for the study area are for 1973 (Figure 2). These map shows a landscape with a few irrigated areas (245 ha), most of them in LM6 (see also Figure 1), and some Rain-fed agriculture on the highlands in the Rain-fed zone (7,213 ha). By 2000, irrigated agriculture had increased almost twenty fold to 4,748 ha in LM6 and LM5/UM5 (Figure 3). Rain-fed farming had more than tripled, to cover an area of 24,911 ha. Rain-fed farming expanded down the slopes of Mt. Kilimanjaro and into the drier areas.

In 1973, crop farming was almost exclusively practiced by non Maasai agriculturalists who had settled in the area from other parts of the country. The Maasai in the area were still

almost exclusively involved in livestock herding, and most of their land was utilized for pasture. Conversion of the forest and rangeland to cropland, and further modification of the cropland was a reflection of two main local processes: (1) immigration into the area by agriculturalists who bought farmland from the Maasai, land which the Maasai had previously used as pasture, and (2) changing livelihood patterns among the Maasai, from pure pastoralists to agro-pastoralists. It is this second process that is the concern of this study.

This section describes how labour organization and labour-time allocation changed for husbands and their wives to incorporate the new activities defined by the new land uses. Comparisons are also made between the Maasai<sup>7</sup> (who are relatively recent cultivators) and the non Maasai, (who are historically cultivators) to assess the extent to which their time allocation differs.

### **6.2.1 General Patterns**

People in the study area still spend more time on livestock related duties than they do on crop related duties (Figure 4 and 5 respectively) in all the agro-ecological zones. Differences in the general patterns of cropping time allocation between the Maasai and non Maasai reflect the groups' historical preferences. Although many Maasai have actively taken up crop farming, they still do not allocate as much of their labour to crop production as non Maasai people do (Figure 6). Non Maasai spend significantly more time than Maasai do on crop production in LH3/UM3 ( $p=0.008$ ) and LM6 ( $p=0.047$ ).

Evidence of Maasai's historical preference for herding, and non Maasai preference for cropping is not visible from an examination of time allocation in livestock production (Figure 7). The difference between the time spent by Maasai and non Maasai is only significant in the irrigated zone ( $p=0.036$ ), with Maasai spending more time than non Maasai. However, non Maasai spend more time in livestock production in the rain-fed zone and the mixed zone than the Maasai do. This is a reflection of differences in livestock production systems, and will be described in greater detail in section 6.2.5.

The historical division of labour that placed the responsibility of livestock production in the hands of the male members of the community has changed. In all the agro-ecological zones, the wives are spending more labour-time on livestock production than their husbands (Figure 4). These differences between husbands and their wives are however only significant in UM4 ( $p=0.075$ ) and LM6 ( $p=0.064$ ). Male and female key informants recognize that women are spending more time on livestock production than they did in the past, but they do not recognize that women are spending more time than men in livestock production. Gender differences in labour-time allocation in crop production show a strong link to the dominant land use patterns. In the rain-fed zone where cropping has been going on for much longer, women are doing more of the crop production activities. In zones where irrigation is practiced (the mixed zone and the irrigated zone) men are doing more of the crop production activities, with the difference being significant in LM6 ( $p=0.034$ )(Figure 5). These differences are a reflection of the different cropping strategies specific to the zones, and they will be described in greater detail in section 6.2.2 and 6.2.3.

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<sup>7</sup> Respondents were grouped by ethnicity based on self identification

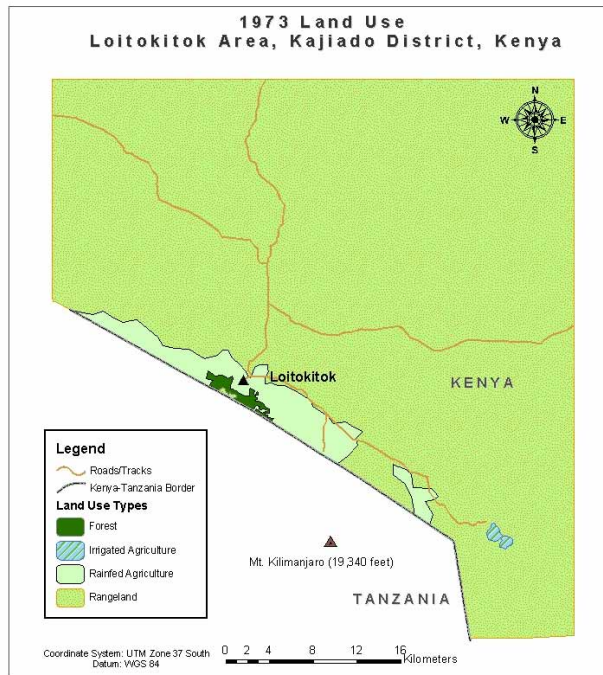


Figure 2 1973 Land Use Map (Source Campbell et, al. 2003)

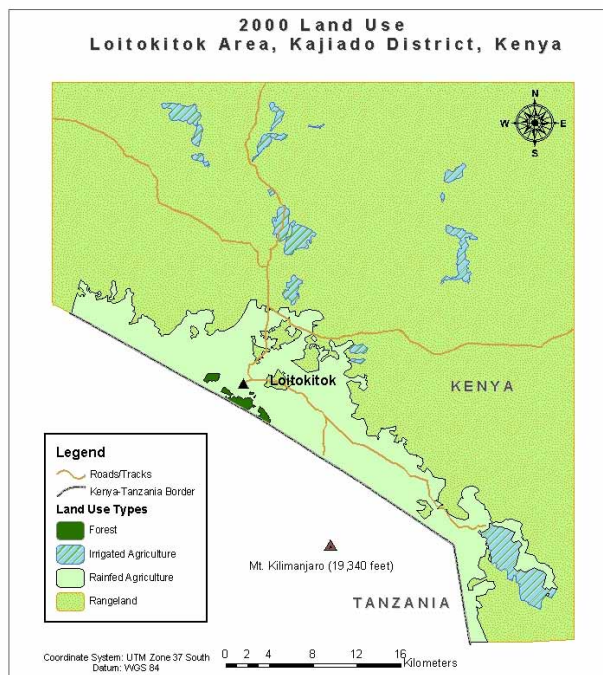
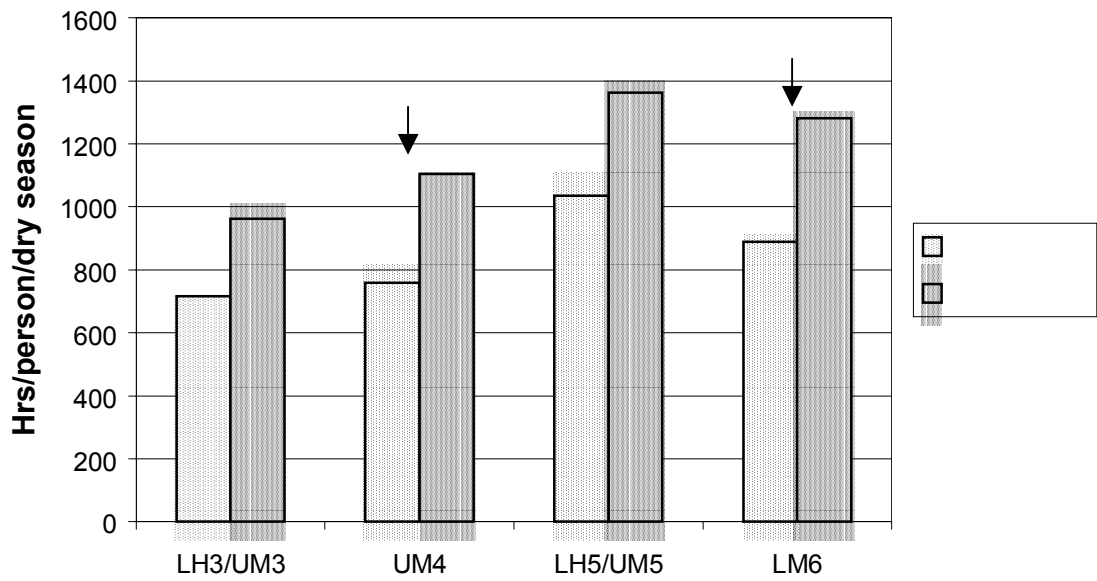
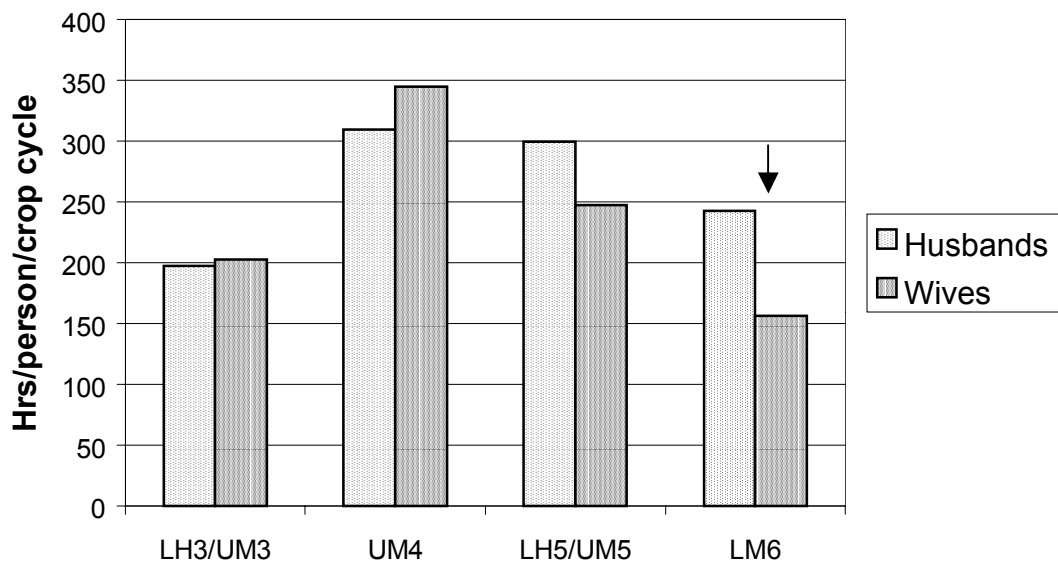


Figure 3 2000 Land Use Map (Source Campbell et, al. 2003)



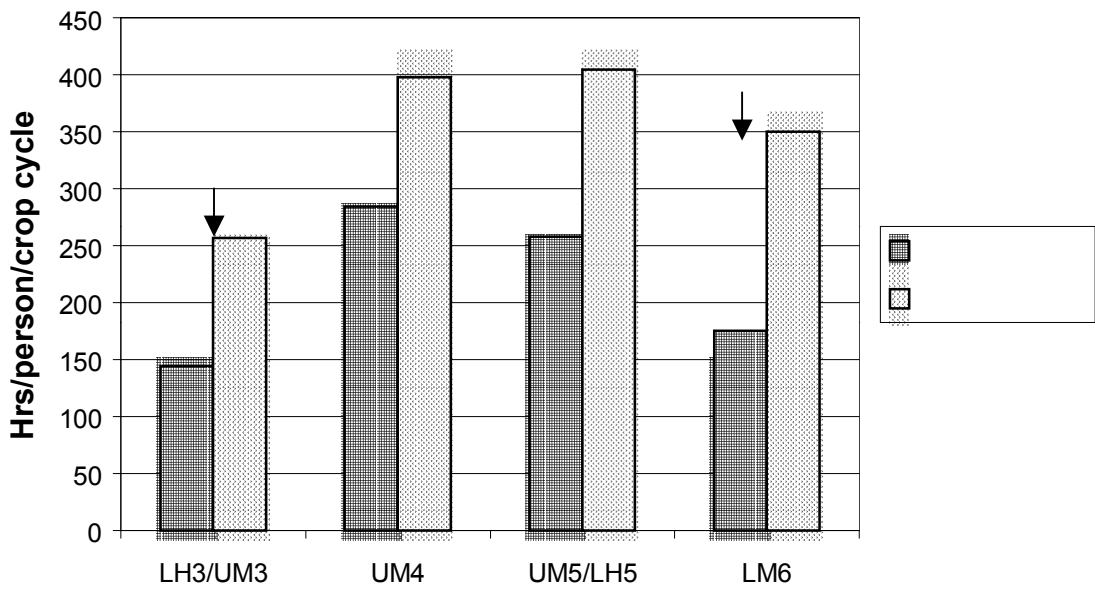
**Figure 4.** Time spent on livestock production in each agro-ecological zone<sup>8</sup> (arrows indicate significant differences)  
Source: Author's fieldwork



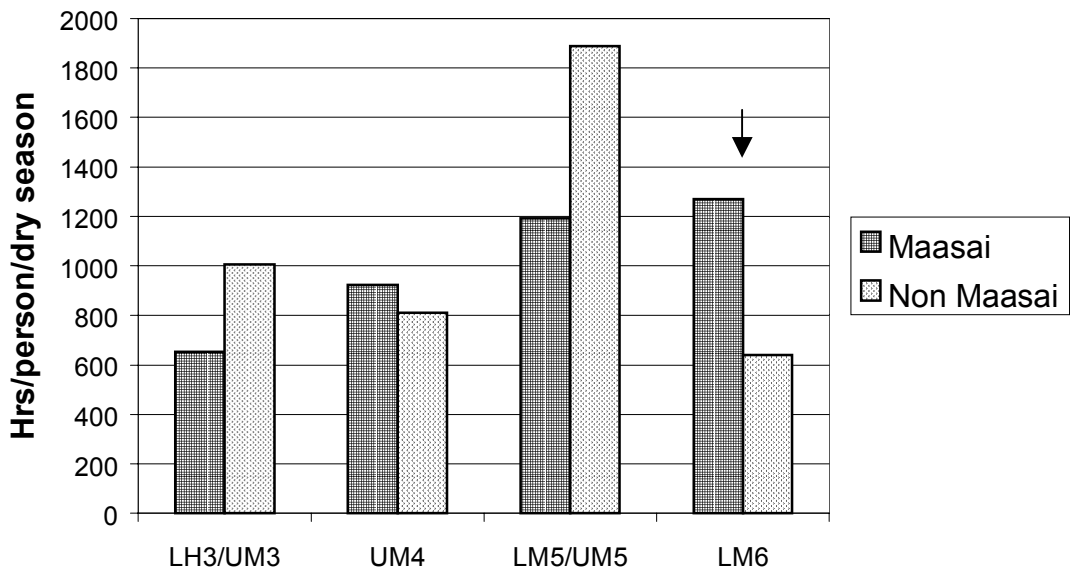
**Figure 5.** Time spent on crop production in each agro-ecological zone<sup>9</sup> (arrow indicates significant difference)  
Source: Author's fieldwork

<sup>8</sup> Data on time allocation in livestock production represents hours spent by each individual during the long dry season (4 months)

<sup>9</sup> Data on time allocation in crop production represents hours spent by each individual during one cropping cycle



**Figure 6.** Comparison of time spent on crop farming by ethnicity (arrows indicate significant differences)  
 Source: Author's fieldwork



**Figure 7.** Comparison of time spent on livestock farming by ethnicity (arrow indicates significant difference)  
 Source: Author's fieldwork

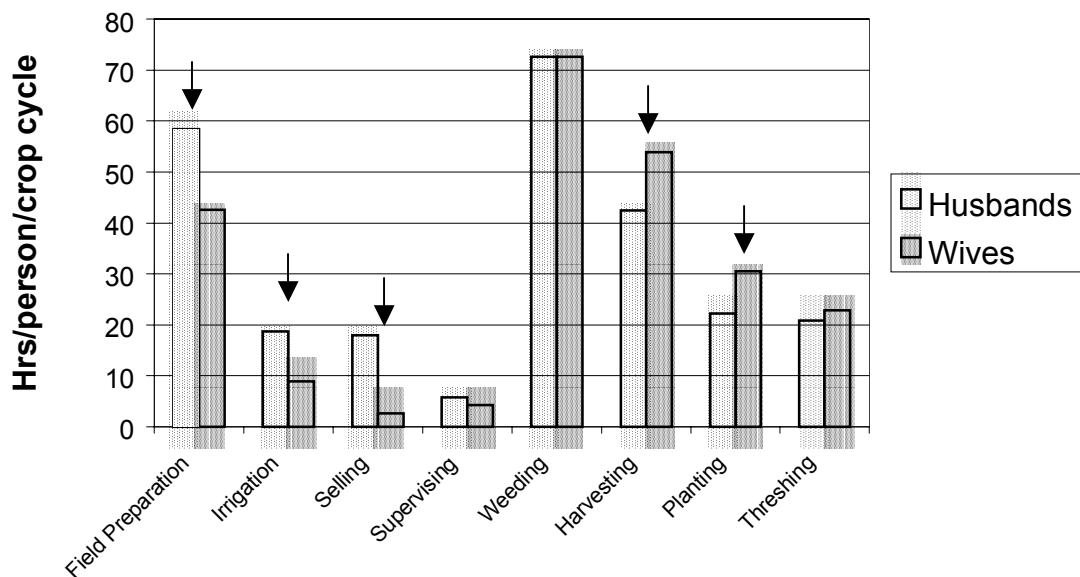


The domination of crop production by husbands in the irrigated zone is related to the perceived difficulty of the tasks involved in irrigated farming. Tasks such as construction of irrigation structures during field preparation, irrigation and maintaining irrigation structures are thus performed by the husbands. The domination of crop production by the husbands is also linked to how long a family has been farming. The irrigated zone is still dominated by ranching, and cultivation is only practiced close to swamps and rivers. Crop cultivation in this zone has been more recent than in the other zones. People are still in relatively early stages of integrating crop and livestock farming, and therefore they still have very clearly defined gender roles. People that have taken up farming in the last two years said that farming activities are too hard for women, and that is why they are predominantly done by men. People who had been farming for longer periods said that as farm related jobs multiply and their urgency increases with increasing crop cultivation, men find that they cannot perform all the activities without the help of their wives, and the gender roles become blurred. This study found a positive correlation between the number of hours wives spent on crop production and the length of time a family had been farming ( $p=0.01$ ). No significant correlation was found between the number of hours men spent on crop production and the length of time the family had been farming. Kitching (1980) reported a similar trend in pre-colonial Kenya and argues that men took up farming before women because men's labour had been freed by colonial policies that limited/banned hunting, raiding and fighting, and was therefore available for re-direction into farming.

### **6.2.2 Gender division of labour by cropping activities**

Labour allocation between husbands and their wives for different cropping activities differs as shown in figure 8. Activities such as field preparation, irrigation, selling and supervising are mostly done by men, while harvesting, planting and threshing are mostly done by women. This pattern of gender roles has been documented in other areas of Africa (Burton & White, 1984; Guyer, 1988b; Kitching, 1980; Netting, 1993). However, results from weeding showed almost equal labour allocation between husbands and their wives. This is contrary to what other studies have found in other areas (Netting 1993, Guyer 1988, Burton and White 1984, Kitching 1980), where women have been found to dominate weeding. Guyer (1988) notes that women's work is dominated by the "symbolism of bending", meaning that women tend to be more involved in activities that necessitate bending, such as field preparation, planting and weeding. This fact does not hold true in our study area. For example, time-time allocation for field preparation was significantly higher for men than it was for their wives ( $p=0.004$ ) even though this involves the "symbolism of bending". Preparing a fallow/previously uncultivated field for cultivation involves first burning to clear small bushes and grasses, followed by slashing to clear the remnants of small trees and finally ploughing (using a hoe or ox-plough). These activities are locally perceived to be male, as they are considered to be very physically demanding. Although tractors are sometimes used in field preparation, these are rare as they can only be afforded by the wealthier members of the community.

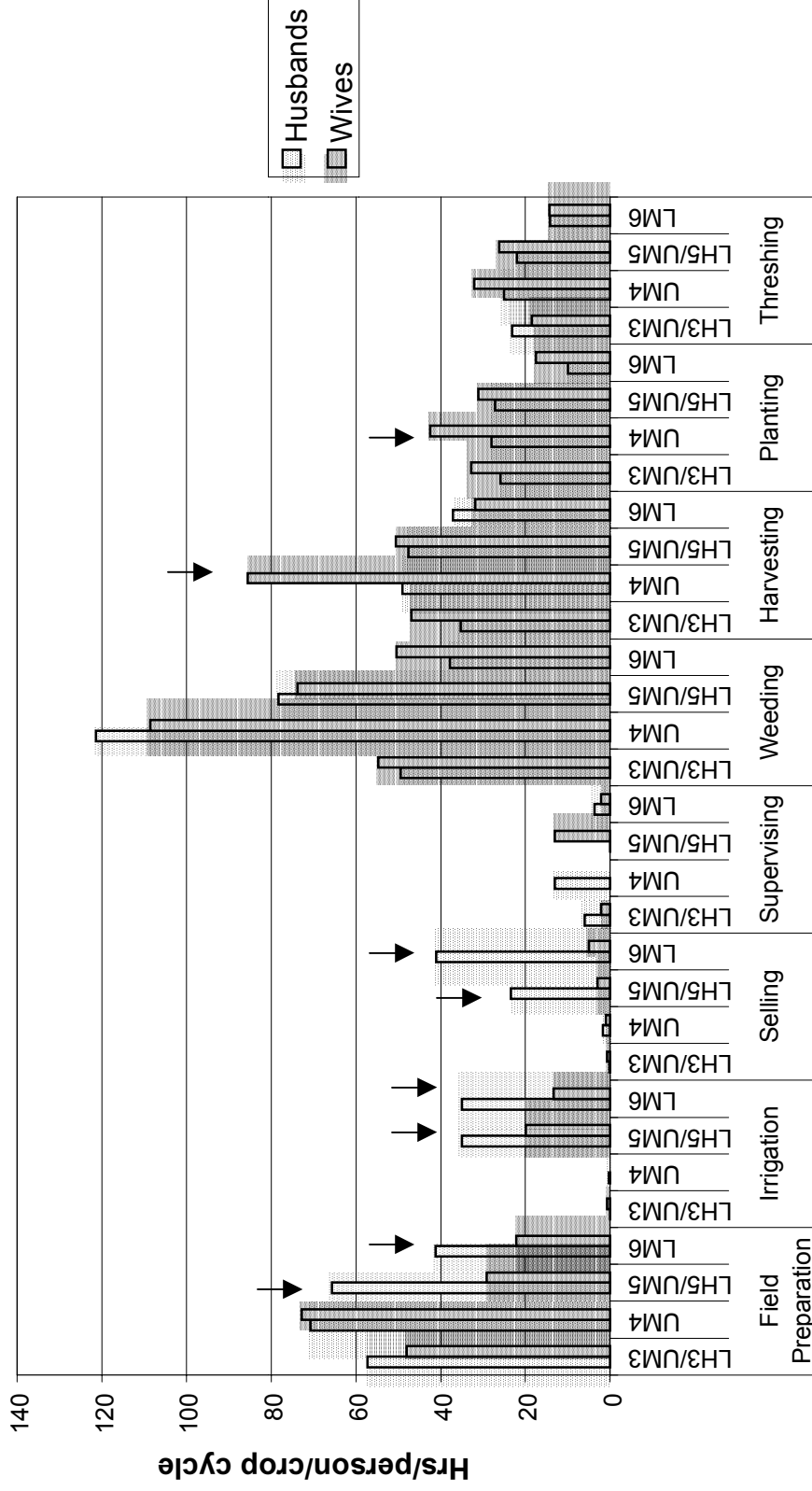
When labour allocation for field preparation is broken down by agro-ecological zone (Figure 9), results indicate that the difference between husbands and their wives becomes more prominent in LH5/UM5 ( $p=0.001$ ) and LM6 ( $p=0.027$ ). Field preparation in these zones involves more than it does elsewhere. This is because in these zones, fields have to be levelled for basin irrigation (the predominant irrigation type in the study area). In addition to the burning, slashing and ploughing, the fields need to be divided into irrigation plots separated by a soil mound. The plots between the mounds have to be levelled to control water flow in the entire field. This is a time consuming activity that is perceived as too difficult for women. Men principally do it, with their wives helping out occasionally.



**Figure 8.** Gender roles in crop production (arrow indicates significant difference)  
Source: Author's fieldwork

to be significant ( $p=0.000$ ) with men spending more time on irrigation (Figure 8). Irrigation is principally done in LH5/UM5 and LM6 agro-ecological zones (Figure 9), where annual rainfall totals, distribution and reliability cannot support rain-fed farming. In both zones, the difference in labour time allocation between men and their wives was found to be significant ( $p=0.037$  in LH5/UM5 and  $p=0.003$  in LM6). This is partly because in these two zones men dominate crop farming (Figure 5). It is also a consequence of the way irrigation is organized in the study area. In many villages irrigation follows a strict timetable to ensure that water is equally distributed among the farmers. Water rights are sometimes negotiated and exchanged between farmers. For example where one farmer does not have enough money to cultivate his farm, he can transfer his irrigation time to another farmer usually in exchange for cash. Preparing an irrigation timetable requires constant consultation between interest parties and is usually done in formal meetings. Formal meetings fall within a (public) domain where women in these zones are often excluded. So starting in the planning stages, matters concerning irrigation fall into the hands of the husbands.

The irrigation activity itself has certain aspects that make it to be perceived as a male activity. First, conflicts erupt when farmers do not respect each others irrigation time. Kenya is in general considered to have serious problems of water availability at the national level (Postel 1993 quoted in (Rathgeber, 1996)). Locally, water availability is compounded by changes driven by investments of the ruling elite, with a large amount of Kilimanjaro waters being deviated through the Nolturesh pipeline to areas outside Oloitokitok Division for flower cultivation. Despite this reduction in the amount of water available for irrigation, the area under irrigation has continued to increase in recent years (Campbell et, al. 2003). Consequently, the trend has been towards longer periods of rotation (the length of time between two irrigation periods) for each farmer. For example, in Empiron area, a key informant told us that ten years ago, every farmer used to get 7 hours of irrigation time every week, but now they get 3 hours every two weeks. Tomatoes require irrigation every 7-10 days (Krugmann, 1996), so unless a farmer acquires extra irrigation hours, his crop is likely to suffer water stress. Farmers narrated how sometimes they divert and/or tinker water from the



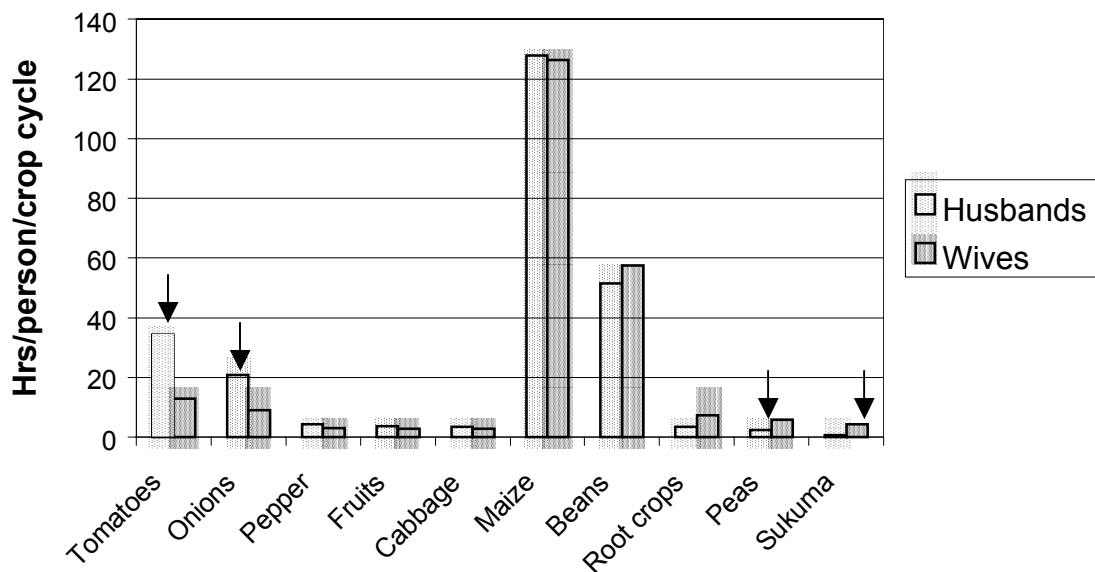
**Figure 9.** Crop production activities conducted by husbands and their wives in different agro-ecological zones (arrow indicates significant difference)  
 Source: Author's fieldwork

main canal to their farms during someone else's irrigation time. This has been reported elsewhere in Oloitokitok (Krugmann 1996), and it is known to happen more to farmers towards the end of the irrigation furrow. Farmers reported that they stole water-time to save their crop and salvage their investment. Perceptions of potential irrigation related conflicts within the community have contributed in defining irrigation as a predominantly male activity, because conflict resolution is principally a male responsibility (Talle 1988, Mitzlaff 1994). Secondly, high demands for irrigation water has meant that irrigation has to take place round the clock. Some families sometimes have to irrigate their fields at night. Women's responsibilities over children and food distribution (Talle 1988) means that they cannot take part in the night duty.

Selling of crop produce is significantly done more by men than by their wives ( $p=0.001$ ). This is shown in figure 8. Figure 9 shows that most selling takes place in LH5/UM5 (significantly different between men and their wives with  $p=0.001$ ) and LM6 (significant difference between men and their wives with  $p=0.019$ ). In these zones, the main crops grown are tomatoes and onions (figure 10). These crops, together with Indian vegetables are grown for markets in Nairobi, Mombasa and even overseas (Campbell et, al. 2000). In 2001, tomatoes and onions dominated the irrigated farms.

Several reasons combine to put selling in the domain of husbands. Selling usually involves long journeys to Mombasa that involve several days absence from the household. Selling also requires negotiations over prices and transport costs/conditions with transporters. In a Kenyan context, farmers/traders involved in transporting goods over long distances frequently encounter police road blocks on their respective routes. Although it is illegal, the policemen frequently demand money from the farmers/traders. Failure to pay up could lead to unnecessary delays before the goods reach the market. These situations sometimes require lengthy and delicate negotiations, which could be costly where perishable goods are involved. Male key informants told me that men negotiate better than women and that women are easily deceived by male buyers who offer women lower prices for their produce and by male transporters who charge women higher transport costs. The women however argued against this explanation and instead said that men prefer to be in charge of the sale of farm produce because that automatically puts the fruits of everybody's labour into their (husbands) control. Women further argued that they participate in selling in local markets, where they successfully haggle and negotiate for good prices for their produce. History would favour the women's explanation over the men's. Trade between the Maasai and the Kikuyu in pre-colonial times was dominated by the women (Muriuki, 1971), Leaky 1956). Spear and Waller (1993) document that Maasai women did travel longer distances than men did in pre-colonial Kenya for trade reasons. During these period, produce was exchanged with produce (barter trade), and this involved considerable negotiation. At the time, men only dominated livestock trade. Livestock was the measure of wealth (Kitching 1980) and arguably the equivalent of contemporary money. History therefore reveals a pattern of male control over exchange value, which is still present today.

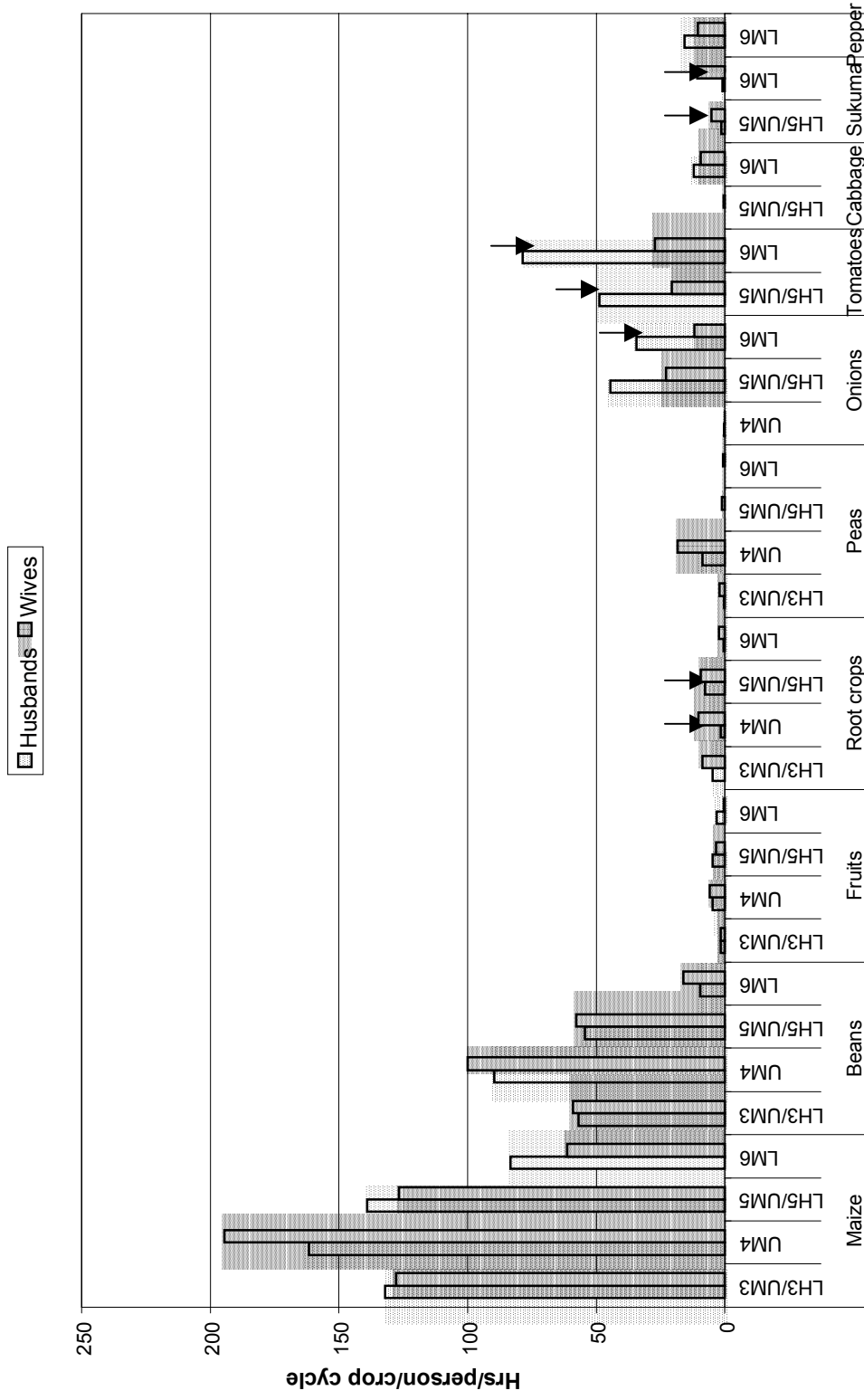
Harvesting and planting are the two activities where women do significantly more work than men (Figure 8) ( $p=0.041$  for harvesting and  $p=0.002$  for planting). Figure 9 shows that women spend more time harvesting than men do in all the agro-ecological zones, except for LM6. However, this difference is only significant in UM4 ( $p=0.012$ ). Figure 9 also shows that women spend more time planting than men do in all the agro-ecological zones. Like harvesting, planting is only significantly different between men and their wives in UM4 ( $p=0.005$ ). Both activities 'symbolize bending' (Guyer 1988) and therefore it is no surprise that it is dominated by women. Both male and female key informants and group discussants reported that women are more involved in planting and harvesting because "they can bend better" and because "they are very patient", qualities that they said were beneficial in both activities.



**Figure 10.** Time spent on different crops by husbands and their wives (arrows indicate significant difference)  
Source: Author's fieldwork

### 6.2.3 Gender division of labour for different crops

Figure 10 shows the time spent on different crops by men and their wives in the study area. This is broken down by agro-ecological zone in figure 11 to show information on the four crops (maize, beans, tomatoes and onions) that occupy the largest amount of crop acreage. Labour allocation was found to be significantly higher for men than for women in tomato ( $p=0.005$ ) and onion ( $p=0.003$ ) cultivation. Labour allocation for women exceeded that of men significantly in peas ( $p=0.042$ ) and sukuma ( $p=0.002$ ) cultivation. When we looked at labour allocation across different agro-ecological zones, we found men to spend significantly more time in tomato cultivation in both zones where tomatoes were grown, i.e. LH5/UM5 ( $p=0.004$ ) and LM6 ( $p=0.044$ ), and in onion cultivation in LM6 ( $p=0.003$ ). Women were found to spend significantly more time than men in root crops in UM4 ( $p=0.001$ ) and LH5/UM5 ( $p=0.088$ ) and in sukuma in LH5/UM5 ( $p=0.038$ ) and LM6 ( $p=0.013$ ). No significant difference was found between time spent by men and their wives in cultivation of the other crops. These results are not surprising and support theses put forward by Schroeder (1993), Guyer (1988) and others: women spend more time than men in growing food crops while the opposite is true for cash crops. Tomatoes and onions are the only two crops that were widely grown specifically for cash, while sukuma, peas and root crops were grown specifically for food. Any surplus in the food crops was shared between friends and kin or sold by women at local markets. Other crops, e.g. maize and beans, met both the cash and food needs of the families. Maize and beans were usually sold on the farm to buyers from Nairobi and Mombasa. This usually happened when there was surplus production and people had enough in store for food.



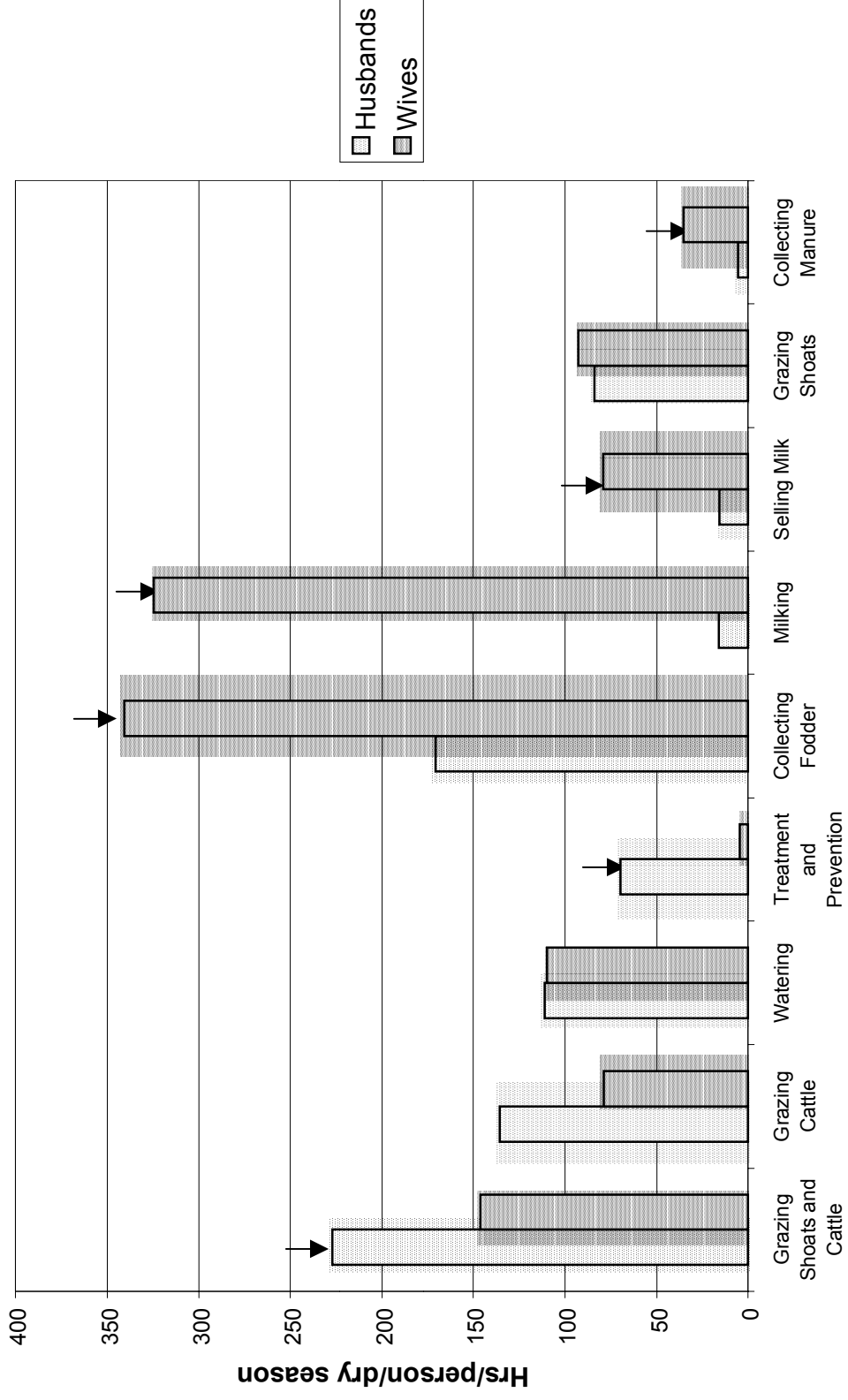
**Figure 11.** Labour time allocation for different crops in different agro-ecological zones (arrows indicate significant difference)

Source: Author's fieldwork

#### **6.2.4 Gender division of labour in livestock production**

Livestock production is historically the main activity of the Maasai. Male and female key informants and group discussants agree that women are now more involved in livestock production than they have been in the past. However, there was a general consensus that husbands still spend more labour time on livestock activities than their wives do. This perception was however not supported by data. Figure 4 shows that wives are doing more livestock related activities than their husbands are in all the agro-ecological zones. This difference is significant at  $\alpha=0.1$  in UM4 ( $p=0.075$ ) and LM6 ( $p=0.064$ ). The difference in labour time between men and women may be related to the changing role of livestock as a measure of wealth. In pre-colonial times, pastoralist societies accorded more value to livestock than to land and crops. During this period, land 'ownership' had a different meaning from what it does today. One could use the land they owned, but they could not transfer ownership to another person. Land only had use value and there was no land shortage. Livestock on the other hand, had both use and exchange value, and therefore were considered more valuable than land. Colonial policies changed land distribution and tenure, and added an exchange value to land. In addition, growing cash crops, which themselves have use and exchange values, added to the use value of land. Ultimately, land and cash crops became more valuable than livestock. Men tend to devote more of their labour time to activities that generate goods with relatively higher exchange values (Guyer, 1988b; Schroeder, 1999). In pre-colonial times, men dominated livestock activities because livestock had higher exchange value. As the value of land rose, and cash cropping increased in importance in the study area, men took up cash-cropping activities, and passed on livestock activities to women.

Major livestock activities in the study area and the labour time spent on them are shown on figure 12. Husbands dominate grazing of herds that contain cattle, watering the herds and conducting activities involving treatment and prevention of diseases. Of these activities, time spent grazing mixed cattle and shoats (shoats = sheep and goats) herds and on treatment and disease prevention varies significantly between husbands and their wives ( $p=0.085$  and  $0.000$  respectively). Wives dominate fodder and manure collection, milking and selling milk and grazing herds of small stock. Except for grazing of shoats, all these activities are significantly different between men and their wives at  $p=0.000$ .



**Figure 12.** Gender roles in livestock production (arrows indicate significant difference) Source: Author's fieldwork



The way livestock feeding labour is organized is a reflection of herd composition; grazing method (stall feeding versus range grazing); distance to pasture; and labour availability in the household. Herd composition defines the interest that male members of the community have in the herd and therefore the amount of labour that they will invest in grazing. Cattle are the most valuable livestock to the Maasai (Saibull & Carr, 1981) and have always been a source of pride and prestige for families. Even though the importance of livestock in the study area has decreased, people's wealth status is still partly related to the size of their herds. Many times in the evenings, elders can be seen in cattle enclaves enjoying the site and smell of cattle as they return home from grazing. It is not surprising that husbands participate more in grazing when there is cattle in the herd, leaving their wives to take part more in grazing of small stock herds.

Stall feeding is more prominent in the rain-fed zone where there is a larger proportion of exotic cattle breeds. Exotic breeds are preferred in many well watered areas of Kenya because they have a higher milk yield than local breeds. Unfortunately they also have a lower tolerance for endemic diseases. Exotic cattle breeds require high quality fodder and plenty of water all year through. For this reason, they do not do well in the drier zones. Contact with indigenous livestock increase the chances for disease transmission to the exotic cattle. This can happen when pests (e.g. ticks) that carry diseases that are less harmful to indigenous cattle are passed on to the exotic cattle. Farmers stall feed their cattle to lower the chances of disease transmission. Stall fed animals have minimal interaction with other livestock that could carry infectious diseases. Stall fed animals are also relatively safer from ticks and other insect pests that are found in bushes.

Stall feeding involves fodder collection, which usually comes from the forest and agro-forest areas in LH3/UM3. Fodder collection is done predominantly by women (figure 13). Husbands will usually help their wives when the amounts required are large and cannot be done by one person. The women transport fodder on their backs or use donkeys and men transport fodder on bicycles or wheelbarrows (and sometimes donkey carts).

In the drier zones (LM5/UM5, LM6) most of the grazing involves taking the livestock over short or long distances. In these areas, fodder is mostly collected during the dry season, when the pasture availability is limited. Fodder collection is dominated by the wives and is significant in LM5/UM5 ( $p=0.005$ ) and LM6 ( $p=0.007$ ). The pods of *Acacia tortilis* are one of the most important sources of fodder for shoats in the dry season. The seeds are collected by women using a long stick with a curved knife attached to the end. The work of the women is to harvest the pods and sometimes transport them short distances to their households. Most times they harvest the pods and the sheep and goats eat them as they fall to the ground.

Organization of grazing labour is also tied to distance to pasture. Key informants said that women are more involved in grazing during the normal rainy and dry seasons. In periods of extended drought, the livestock is taken to the better watered Chyulu Hills until moisture conditions at home become more favourable. This long distance grazing orbits could necessitate up to several months absence from the home. Because women have other responsibilities related to child care and home management, this longer grazing trips are done by men.

The amount of labour available in the household influences how grazing labour is organized by gender. It was predominantly done by the younger unmarried males of the household. As more and more of this age group had enrolled in school, the household labour pool has shrunk. The labour void thus created has been filled more by the wives than by the husbands (husbands have moved on to crop production).

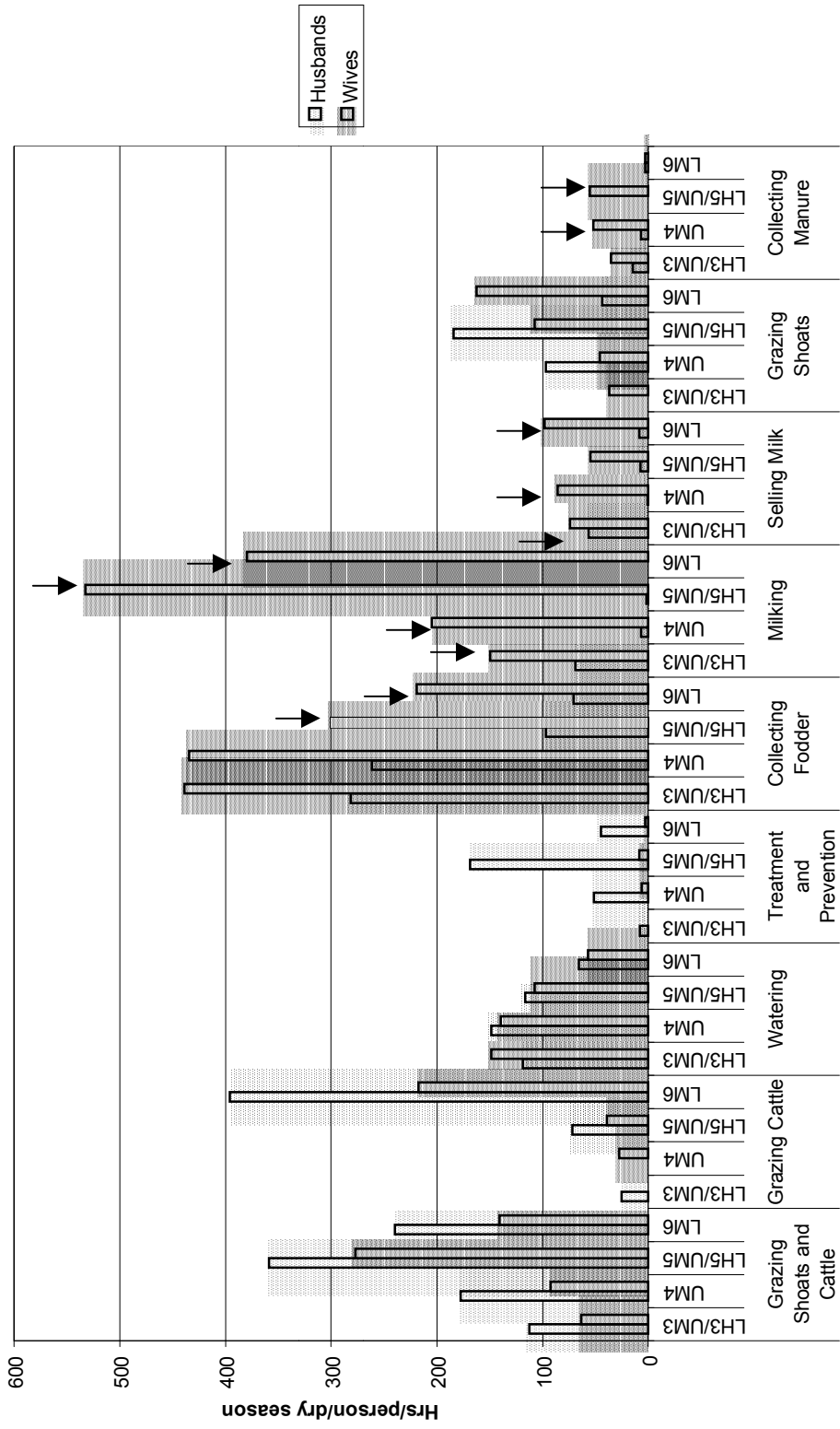
Treatment and prevention of diseases usually involves administration of unpleasant tasting drugs and/or injections to livestock. This task cannot be performed by one person as it requires several people to hold the animal still as one person administers the treatment. Women told us that they do not like to hold down the animals and will only do this in the absence of male members of the family. Administration of drugs is therefore done almost exclusively by the husbands.

Gender roles have not changed in certain livestock activities. Two of these activities are milking and selling milk (figures 12 and 13). Milking is significantly dominated by women (at  $\alpha=0.1$ ) in all the agro-ecological zones ( $p=0.000$  in all zones except for LH3/UM3 where  $p=0.059$ ). Cattle are milked twice a day, in the morning before they go out to graze and in the evening after grazing.

Selling of milk is significantly dominated by women in 3 agro-ecological zones at  $\alpha=0.1$  ( $p=0.034$  in LH3/UM3,  $p=0.052$  in UM4 and  $p=0.000$  in LM6). Maasai women sell milk when the product is relatively abundant. The amount of milk sold and the price varies with season. During the rainy season, there is an abundant supply of milk, and women are more ready to sell. However the demand for milk is also lower during the rainy season and therefore the price is low. During the dry season when the cows produce less milk, the demand for milk is higher and the price is also higher. In 2001 in Oloitokitok town, the price of milk during the dry season was Ksh 30 per bottle (1 litre) and half that during the rainy season. In places further away from the town centres, the prices are more variable and considerably lower. Other livestock products (e.g. ghee, sour milk, hides etc) are not sold in large quantities because their supply is limited. Ghee is sometimes sold to teachers, government officials and local businessmen living in the local towns. Considering the lower price of livestock products in relation to the price of consumer goods (e.g. sugar), and the rising inflation rate, the amount of money that women receive from the sale of livestock products is quite modest. The women in the study referred to the modest amount of cash received from the sale of livestock products as 'money for tobacco' (tobacco is very cheap).

Men are sometimes involved in the sale of milk. This usually happens in non Maasai households where cultural linkages of milk to women are absent or weak. In the study, 72% of the men that sold milk were Kikuyu. The remaining 28% of men that sold milk were Maasai. In these situations, the families involved had a large herd of cattle and milk sales were commercialized. The women in such cases lose control of the milk money. This tendency has been reported in Maasai communities in Tanzania (Ndagala, 1982) and Kipsigis smallholders in Kenya (Talle 1988). Selling of hides, usually in the domain of women can also fall into men's hands. Key informants told us that in periods of prolonged drought, herders lose large numbers of their livestock and there is an abundance of hides and skins. These usually fetch a good price and men usually take over the sales. Key informants told me that the reason men take over the sale of milk and hides when there is a lot of money involved is that women cannot handle business deals or large amounts of money.

Manure is usually collected as women clean the livestock sheds. The manure is then stored in a heap outside the livestock shed, and later spread on farms. Farmers who apply manure on their farms said they did this at the beginning of the cropping season before field preparation. Manure application is more important in LH3/UM3, UM4, LH5/UM5 than it is in LM6. This is illustrated in the time spent collecting manure in the four agro-ecological zones (Figure 13). Women spend more time than men in all the zones, but the difference is only significant in UM4 and LH5/UM5. We speculate that this is because these zones have lower proportions of non Maasai people, among who manure collection is also done by men (e.g. in LH3/UM3).

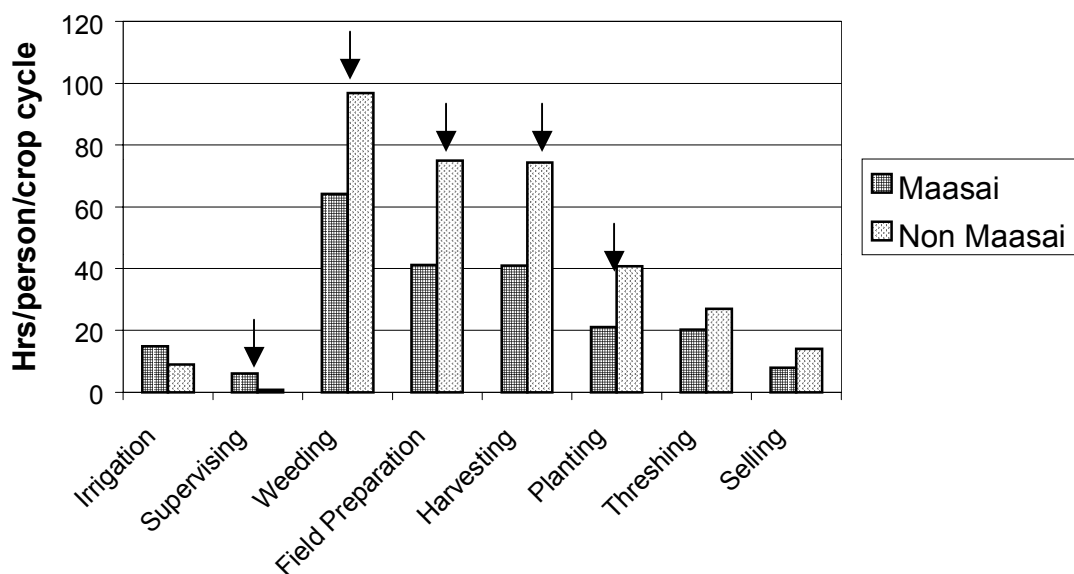


**Figure 13.** Livestock production activities conducted by husbands and their wives in different agro-ecological zones (arrows indicate significant differences)  
 Source: Author's fieldwork

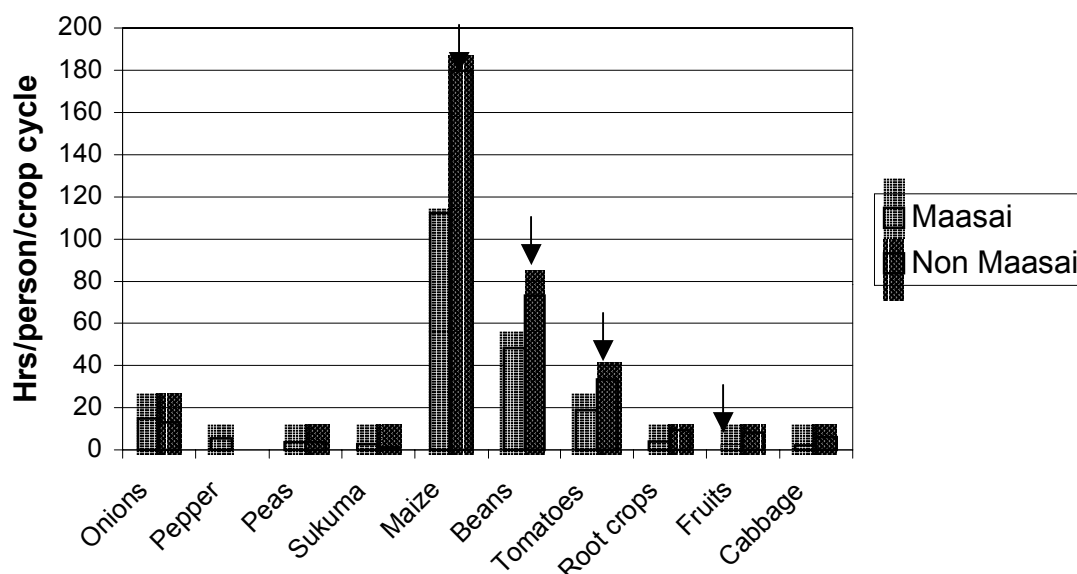
### 6.2.5 Differences between Maasai and non Maasai in labour allocation

The ethnicity of the Maasai has been described as ‘fluid’ or ‘mutable’ (Sobania, 1991; Waller, 1985). Historically, the Maasai have had fluid identity boundaries with their neighbours, the Arusha, and Torobo and the Kikuyu. Galaty (1993) describes the complex social processes of “inclusion, exclusion and boundary shifting in Maasai identity” (p. 174). Intermarriages, bilingualism, migration and recent economic diversity all contribute to make the Maasai identity complex. The author carried out analysis based on ethnicity using the identity that the respondents ascribed themselves. A husband and his wife can have different ethnic identities, as can a parent and his/her child. Analysis based on ethnicity is further compounded by the fact that ethnicity on its own does not provide a complete explanation of the differences observed in crop and livestock farming. Rather, ethnicity intersects with ecology, economics and politics to define what people grow, how they grow it, and where they grow it.

In general, non Maasai spend significantly more time than Maasai in most crop farming activities (Figure 14). Maasai spend significantly more time than non Maasai only in supervising ( $p=0.038$ ). This is because the Maasai use more hired labour that require supervision than non Maasai do. Hiring of labour comes out of necessity for the Maasai, who dominate the irrigated areas and grow principally cash crops. Most activities in the irrigated zone need to be done all at once, and cannot be completed using family labour. This fact is compounded by the fact that although more and more Maasai women in the irrigated areas (LH5/UM5, LM6) are involved in crop farming, the numbers are still small and most of the family labour still comes from the men as discussed above (see figure 6). For example, farmers prefer to transport their produce to market in one trip to minimize indirect transport expenses such as bribes to policemen and accommodation at the selling point. This requires that harvesting is done quickly to minimize spoilage, and thus labour is hired for the exercise. Non Maasai spend significantly more time on weeding ( $p=0.021$ ), field preparation ( $p=0.001$ ), harvesting ( $p=0.000$ ), and planting ( $p=0.000$ ). This is because non Maasai on average cultivate larger fields and use less hired labour than the Maasai do. Non Maasai spend significantly more time on maize ( $p=0.000$ ), beans ( $p=0.021$ ), tomatoes ( $p=0.025$ ) and fruits ( $p=0.048$ ) (figure 15). Maize and beans are low input crops that also do not sell for a lot of money. For this reason, maize and beans are grown mostly for food, with some extra being sold in good years. Maize and beans are grown on the rain-fed areas where the fields are much larger, and that is why they take up more time than other crops do.

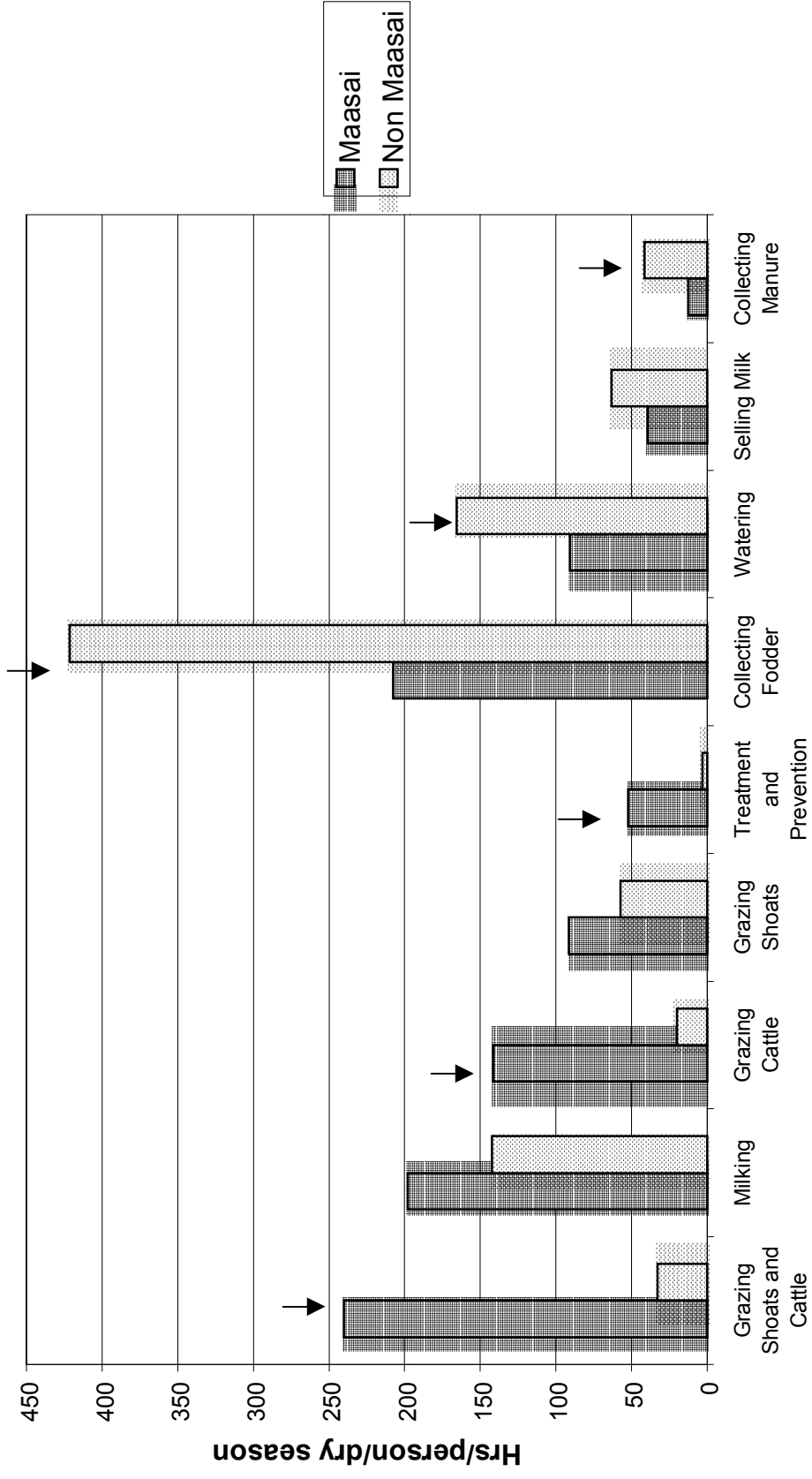


**Figure 14.** Crop farming by ethnicity (arrows indicate significant differences)  
Source: Author’s fieldwork



**Figure 15.** Time spent on crops by Maasai and non Maasai (arrows indicate significant differences). Source: Author's fieldwork

Differences in time spent on livestock production by the Maasai and non Maasai are shown in Figure 16. There are significant differences between the time spent on grazing by Maasai and non Maasai, depending on the composition of the animals in the herd. The Maasai spent significantly more time grazing when cattle are included in the herd ( $p=0.000$  for grazing cattle, and  $p=0.000$  for grazing cattle and shoats). This is as a consequence of differences in animal husbandry techniques between the Maasai and non Maasai, a difference that is partly driven by ecology, and partly by historical livelihoods. The Maasai keep most of their cattle in the LM6, the livestock agro-ecological zone. From an ecological perspective, this is an efficient as the zone is too dry for crop farming except where irrigated. One way rangeland can be converted to products useful for human consumption is through livestock rearing. Historically, the Maasai have reared livestock in the rangeland using time consuming techniques. Cattle grazing was not just a method of production, it was a way of life. Cattle grazing was a time consuming exercise that involves herding over large areas. Grazing orbits can be up to 9.84 km during the dry season and 8.63 km during the wet season (BurnSilver, Boone, & Galvin, 2003). The non Maasai on the other hand keep most of their cattle in the Rain-fed zone. Due to competition from crop farming, animal husbandry techniques differ in LH3/UM3 and UM4. High yielding cattle breeds are zero-grazed. Fodder is collected and water is fetched and brought to the animal stall. Non Maasai spend significantly more time collecting fodder ( $p=0.003$ ) and watering their animals ( $p=0.035$ ) than the Maasai do. Historically, the Maasai have treated their livestock with herbal medicine when they fell ill. More and more they use alternative medicine, but they still treat their livestock themselves. The non Maasai usually keep exotic breeds, and use professional veterinary services more when their cattle fall sick. The Maasai therefore spend significantly more time on treatment and prevention than do the non Maasai ( $p=0.000$ ). Collection of manure is done more by non Maasai than by the Maasai ( $p=0.028$ ). A reflection of the agro-pastoral techniques used in different zones. People in the Rain-fed zone (dominated by non Maasai) use manure in their fields more than people in the other zones (dominated by Maasai). Consequently they spend more time collecting manure. A second reason for this is that more manure collects in stalls in zero-grazing systems than in systems where the animals are let out of the stalls. Therefore there is a lot more manure to clear in zero-grazed stalls.



**Figure 16.** Time spent on livestock production by Maasai and non Maasai (arrows indicate significant differences) Source: Author's fieldwork

### **6.3 Why the gendered division of labour in crop and livestock production is changing**

Changes that were observed in gender roles in Oloitokitok Division are linked to 4 major forces: (1) land use change (2) social factors (3) national government policies and (4) structural adjustment policies. None of these factors acts on its own, rather they act together and they have an influence on each other as well.

#### **6.3.1 Land use change**

Cropped area has expanded at the expense of grazing land. Households have taken up new land uses, such as crop farming, and this has brought new activities that have influenced work and how work is shared in the study area. One reason for this shift in land use has been the decline in the importance of livestock as a food and economic resource, and consequently a need to find alternative sources of food and income. Herds are too few to satisfy either the nutritional or the economic requirements of family members. The vegetarian component of the diet is very important, especially during the dry season. This fact has been observed in other pastoral areas as well (Talle, 1988/1994).

Pastoral communities have the choice of growing their own foodstuffs or relying on purchased products. Fifty-one per cent of the households in our study indicated that their expenses on food had increased in the past 10 years. Fifty-four percent told us that food was one of the three most important expenses in their households. Reliance on purchased food products is a general trend in pastoral communities in East Africa (Hjort, 1982), Århem 1985). One explanation for this is linked to number of tropical livestock units per capita. Pratt and Gwynne (1977) recommend a minimum of over 5 TLU per capita to meet food requirements. The reason for this is that there would be enough milk to become an important part of the diet. The sampled population in this study has a 2.3 TLU per capita, meaning that livestock alone cannot meet the food requirements of the population. This is one reason that families purchase foodstuffs to help meet their requirements. Talle (1988) found that consumption of purchased foodstuffs was higher during the dry season when milk yield is considerably low (an eighth of the rainy season amounts). As much as possible, households will try to grow what food they can, and spend money only on commodities that they cannot grow (e.g. sugar, cooking fat).

In addition to the expansion of cropped areas, there has also been land use intensification. Intensification has involved a change in the types of crops grown and methods of farming used. As illustrated in chapter three, people have expanded crop production in to dry areas, where they practice irrigation. Farmers have also changed the types of crops grown, and moved towards more labour intensive cash crops.

Intensification has been directly related to increasing population density and a consequent need to raise production per unit area (Boserup, 1981). Population in the study area has been increasing both from in-migration and natural increase. The population of Oloitokitok Division increased more than fifteen fold between 1948 and 1999 (calculated from 1948 and 1999 Kenya population census). One way that communities increase production is by increasing the labour input in the production process (Netting, 1993). In the study area, intensification has increased labour demands and affected gender roles in crop production. This has happened through changes in the types of crops grown and changes in the methods of farming.

During group interviews, farmers explained that maize, beans and potatoes, the initial crops grown in the rain-fed area, are less labour intensive than tomatoes, onions, cabbages, *sukumawiki* and peas. Farmers estimated that one crop of maize, which is in the field for seven months, only requires half the time (per ha) that one crop of tomatoes or onions, which are on

the field for about 3-4 months require. Tomatoes, onions, pepper and cabbages can be grown all year long as they are grown principally using irrigation. The labour for these four crops comes mostly from men (Figure 10).

The methods of farming in the study area have expanded to include both rain-fed and irrigated techniques since the 1970s (see chapter three). Irrigation is more labour intensive than rain-fed farming. This is because irrigation process involves activities that are not required in rain-fed farming. These activities include construction and maintenance of irrigation structures and watering the field. As explained in section 6.2.2, these activities are usually done by men. Crop intensification, which has mostly happened in the irrigated and mixed zones, has resulted in increased labour demands, most of which have fallen in the hands of men.

Intensification in livestock keeping has also affected the amount of work done and gender roles in livestock production. The number of livestock kept has reduced and the types of breeds have changed as people respond to the reduction in grazing areas (among other changes). Over the past ten years, there has been a general trend towards smaller herd sizes in the study area. This trend was aggravated by the recent drought in 2000. Cattle owned by the Maasai in Oloitokitok Division reduced from 40,705 to 14,857, goats reduced from 25,769 to 14,407 and sheep from 35,007 to 19,800 between 1999 and 2000 as a result of drought (SARDEP, 2001). In the irrigated zone and mixed zone, people prefer to keep larger breeds (e.g. the ndama) that will fetch more money and sell faster in the market than the traditional zebu. In the rain-fed zone, and parts of the mixed zone, people stall feed grade cattle which have higher labour requirements than the traditional zebu. It has been found that once the herd size dropped below a certain limit, Maasai men became less interested in the management of their animals, leaving a great deal of responsibility to their wives (De Souza 1982). This study speculates that reducing herd sizes has contributed to transferring livestock time-time from husbands to their wives.

### **6.3.2 The role of the national government**

The concept of development (*maendeleo*) has been promoted by Kenya's national and local government officials since independence. A developed individual is perceived by local communities as one who has had a formal education, practices a religion other than African Traditional Religion (ATR), wears non-ethnic dress and lives in a brick house. This meaning of development has influenced the way people have made their choices, especially since a lack of *maendeleo* is interpreted as backwardness (*ushamba*). Development has had an impact on changing gender roles through changes in school enrolment, religion and house construction. The impact of school enrolment will be discussed in this section, while that of religion and house construction will be discussed in section 6.3.4 (social forces).

Increased school enrolment has had an impact on gender roles in crop and livestock production. Fifty years ago, there were no schools in the study area and children stayed home and helped their parents. Schools have since been built and people have developed a high value for formal education and have started to send their children to school. Schools are seen as one way to equip children with skills that will enable them to be successful adults, and consequently provide economic and social status to the family. Formal schooling has removed from the household an important labour resource, and placed an extra workload on parents. Although on average Kajiado District has fewer people aged between 5 and 24 in formal education institutions than the national average, the national pattern of higher attendance by males is maintained. Thirty-eight per cent of the females in the district aged 5 to 24 attend formal schooling (national average is 55%) and 45% of the males attend formal schooling (national average is 60%) (figures calculated from the 1999 Kenya Population Census). This is because parents are deliberately enrolling their sons in formal schools more than their daughters. Parents view their children's education as an economic investment and they perceive a son's education as more beneficial to them than a girl's education. They argue that a girl grows up and leaves home to get married and only benefits the family into



which she marries, while a boy will not leave home. Parents also argue that investing in a girl's education was risky as girls stood a higher chance of dropping out of school than boys did, due to pregnancy, early marriages, or both. Girls are also an important source of wealth (bride price) especially for poor families, who prefer to obtain an income by marrying off their young daughters, rather than spend money on them through school fees. Hodgson (2001) observed a similar pattern in school enrolment among the Maasai in Tanzania. Key informants said that this fact has increased the amount of work assigned to the girls, as they have taken up the activities that were initially performed by their brothers. Key informants told us that most of what school going children used to do has also been passed on to the mothers.

### **6.3.3 Structural Adjustment Policies**

Kenya's national economy has not performed well since the 1980s (Republic of Kenya, 1991, 2001b). The changes in the economy have contributed to increasing poverty in the country (Gitobu & Kamau, 1994; Ikiara, Jama, & Amadi, 1993). The World Bank's structural adjustment policies have increased the cost of education and health. These changes in the economy have combined with people's increasing needs to improve their economic performance. The growing need for cash and the lack of cash resources has been found to encourage poor pastoral families to settle close to trading centres and small towns where job opportunities, or market and cropping facilities are better (Anderson & Broch-Due, 1999; Barth, 1964; Talle, 1988/1994). In the context of Oloitokitok, the people have diversified their economic base by settling close to transport networks and taking up new activities, and intensifying some of their older activities. In addition to activities already discussed, people have also taken up small businesses and engaged more in waged labour. Furthermore, for those dependent on purchased foodstuffs, the distance to shops and markets further encourages settling close to transport networks. Both men and women have taken up these new activities.

Another product of World Bank's structural adjustment policies has been market liberalization (Fontaine, 1992; Ikiara et al., 1993). For a country to be able to compete favourably in the global arena, it needs to minimize the cost of production as much as possible. One way to do this is to build and maintain a good infrastructure. The study area is unfortunately very badly served in this respect, and a large part of the cost of production goes into transport costs that have been inflated by the poor status of the roads. Market liberalization has introduced competition from Tanzanian farmers, who have lower production costs due to their more superior infrastructure. Kenyan farmers from Oloitokitok cannot afford to sell their produce as low as the Tanzanians do. In 2001, many farmers left their tomatoes to rot on their farms due to this stiff competition. One way that people try to lower their production costs in the study area is by relying solely on family labour and avoiding reliance on hired labour. Respondents complained that they are usually over committed in crop and livestock production as well as other domestic activities.

### **6.3.4 Social forces**

National development strategies can have societal implications that influence how labour is organized within the household. One such strategy has been the land reform process explained in section 5.4.2. In Oloitokitok Division, the land reform process necessitated a re-organization of Maasai residential units (Kipury, 1989). The homesteads have become smaller, more permanent, and extended family units have become more dispersed. At the time of this fieldwork in 2001, the division had many nuclear family settlements. Re-organization into smaller units has reduced the number of people per unit of production, and therefore either increased labour time allocation for each person or for certain categories of people or both. Examples of activities that can be affected by homestead re-organization include livestock grazing and watering, and child care. During group meetings, respondents felt that homestead re-organization, although important, was on its own not a critical driver for changes in the division of labour.

Changes in house structure has also had an impact on the gender division of labour. Traditional Maasai houses (*enkaji*) were relatively smaller than those constructed more recently. The walls and roof were made by women from a mixture of mud and wattle. The *enkaji* could optionally have been grass thatched. Those who can afford it now construct houses with concrete or wood walls and corrugated iron roofing (*mabati*). Changes in house structure are a visible indication of increasing permanence of residence and affluence in a family. Modern houses are a symbol of economic and social standing that a man has achieved. They are usually constructed by the more educated male members of the community with stable incomes. They are found more in privately owned land than on the group ranches<sup>10</sup>. The *enkaji* was constructed and maintained by the women of the house. In contrast, the modern houses are built principally by the man. Men collect and put up the poles which support the house. The women do the plastering and thatching. In cases where a family builds a concrete or wooded structure, the work is done by paid craftsmen. Changing house structures have also meant that women are relieved of the constant task of repairing houses during the rainy season.

An unlikely driver of changes in gender roles has been religion. Fifty years ago, people practiced Maasai traditional religion to a great extent. Today, many Christian churches have local parishes and a large following, especially among the younger generation. Key informants told us that Christianity has changed the way that society perceives women by lifting their social status. Religious leaders condemn wife beating practices and encourage men to treat women as equals. One result of this has been an expansion of women's economic opportunities as husbands now allow them to travel further and work more independently than they did before. This has also increased the economic responsibility that women have, and the time they spend on livestock and crop duties.

A common explanation by key informants for changing gender roles is influence from non Maasai communities, most notably the Kikuyu farmers. The Maasai were livestock herders who frowned upon crop farming, thinking it a lowly activity for them. Indeed, only the poor Maasai who had lost all their livestock practiced farming (Anderson & Broch-Due, 1999). Interaction with other communities and the introduction of a monetary economy contributed to change these attitudes. One way that interaction with other communities occurred was by marriage. Galaty (1993) gives an account of how Kikuyu women married by Maasai men learned to intersperse cultivation with the annual movements of cattle in order to be able to continue farming (the Kikuyu livelihood). Interaction also occurred through *osotua* (friendship bond) (Sobania, 1991). This came out of close economic (trade) and social (raids) ties between Kikuyu and Maasai (up to 1890).

More recently, interaction has come out of migrations of non Maasai ethnic groups into Maasailand (Campbell, 1993; Campbell & Olson, 1991a; Waller, 1993). Continued interaction and intermarriages with other communities transferred farming skills to Maasai communities. The Maasai in the study area no longer consider livestock to be the single measure of wealth. Wealth is increasingly measured on monetary terms. The Maasai reported that they have learned from interaction with other communities that there is wealth (money) in crop farming too. This has changed their attitude towards crop cultivation and created an interest in cropping. Since the 1970s, the Maasai have taken up crop-livestock farming as a livelihood system and not as a temporary activity during periods of extended drought.

Interactions with the Kikuyu and other farming communities (e.g. the Kamba and Chaggah) has impacted on the role that Maasai women play in crop production. During key informant

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<sup>10</sup> Group ranch members told me that they did not want to invest in constructing permanent dwelling units, because they might have to relocate their homes after the group ranches are subdivided.

and group meetings, Maasai women who have been farming for relatively longer periods explained that initially their husbands thought that women were too weak to farm. The husbands changed their attitude when they continuously witnessed women from other farming communities doing the activities that they perceived to be too hard for women. Similar patterns of women's exclusion from what is perceived to be hard physical work have been reported among the Tuareg (Rasmussen, 2002). Unlike in Oloitokitok, proximity to farming communities whose women are engaged in what is perceived to be hard physical work has not influenced work patterns among the Tuareg.

#### **6.4 Labour negotiation within the household**

The nature of gender relations can best be understood through the use of a more detailed unit of analysis than is provided by the household (Guyer & Peters, 1987). Households constitute many actors with different preferences. One way that gender relations manifest themselves is through the division of labour within the household. Evidence from several geographic locations reveal gender inequalities in the way labour is allocated (Agarwal, 1997a; Steinmann, 1998). The labour allocation patterns described in previous sections can be seen largely as socially constructed and not biologically determined. Labour allocation patterns are closely tied to ideologies and meanings that individuals and groups attach to 'maleness' and 'femaleness'. The evolution and continuing transformation of the production regime, and consequently the labour process in Oloitokitok has resulted in dynamic and highly contested meanings.

The household is a site of cooperation and conflict between husbands and their wives as they strive to ensure survival for the entire household. Men and women will cooperate if cooperation benefits the household. Conflict will arise where cooperation is seen to benefit certain members of the household more than others. The forms of contestations that arise from the conflicts can be limited by social norms (Agarwal, 1997a). Some women may opt for forms of contestations that will not define them as social outcasts, while others could be more radical in their approach. The nature that cooperation/conflict takes is closely related to power relations within the household, especially regarding to who participates in decision making. The power that an individual has to negotiate for control of their labour is related to their economic power, as defined by their economic assets, and to their age.

In the Oloitokitok context, economic assets of women are mainly in the form of exchange entitlements, and endowments such as labour power and a limited amount of the crop and livestock harvest. Men's economic power primarily stems from sale of crop and livestock produce. In poorer households that do not have enough land or cannot afford farm inputs, men obtain economic power by selling their labour in the agricultural market. A person's age sets certain limits to a person's ability to negotiate despite their economic power. The Maasai division of labour is organized around age sets (Spencer, 1993; Spencer & International African Institute., 1988) and social norms therefore limit negotiation capacity of individuals. Elders are the ultimate decision makers regardless of their economic power. An elder has the power to temporarily redistribute milking rights among his wives or the wives of his progeny, with implications for women's milking time and access to milk. Among women, age combines with education to increase an individual's ability to negotiate. Key informants said that young educated women will have more control over their labour than older uneducated women. This is because educated women have access to wage employment and a stable income that contributes to household survival.

In the Oloitokitok study area, cooperation more than conflict is the dominant result of negotiation. In single gender focus group discussions, both men and women said that they had so much to do to ensure survival of their households that "everybody does everything". In the rain-fed zone where farming has been going on for a longer time, men explained how they take up previously female dominated activities such as weeding. They said that failure to help the women would result in a loss of part of the crop, further increasing the problems that

the household has to deal with. In the irrigated areas where crop farming is more recent, women explained how they have to provide their labour to grow cash crops, as the sale of the crops provides an income that benefits the entire household.

Cooperation breaks down when individuals fail to see the benefits of their labour. Key informants and single gender focus group discussions indicated that this usually happens when men fail to meet financial needs of the family, and instead use the fruits of the family labour for selfish gains. Women complained that many men increase their alcohol consumption after the sale of farm produce (crops and livestock). When this is done in excess, the family's food, health and school fees needs are jeopardized. Women engage in implicit forms of contestations over their labour. They withhold their labour from the family farm and instead hire it out. Women said that this gives them the ability to provide for education, food and clothing needs for themselves and their children. Women's entry into wage labour increases their economic power and therefore their ability to negotiate within the household. The women of Oloitokitok study area said that their husbands were more willing to let them decide what they did with their time when the husbands had seen financial benefits of their wives labour in the household.

An extreme form of contestation involves complete withdrawal of the women's labour from all the household's activities. Women leave their husband's household and return to their pre-marital home ('running away'). This usually happens when other forms of negotiation fail. Women said that they arranged their 'running away' so that it coincided with the beginning of the crop cycle. This also coincides with the end of the dry season when the granaries are either empty or almost so. Key informants said that women who choose to 'run away' are those whose husbands continuously sold most of the harvest leaving little food for home consumption, and used the money on themselves and not on the needs of the households. 'Running away' when the granaries are empty and female labour is required on the farm forces the husbands to the negotiating table fast. He has no time to install a replacement (another wife) and find food for the children, and he has no money to hire labour to work on the farm. 'Running away' is a powerful form of contestation as it exposes a husband's wrong doing to the elders, with whom he has to negotiate before his wife is allowed to return to her matrimonial home. 'Running away' is a socially accepted form of contestation for women and there is no fear of stigmatization associated with it. For this reason, it continues to be used, more so by women who are powerless to use more radical forms of contestations. Participant observation and key informant interviews revealed that women who ran away did not have much control over their labour and therefore could not achieve any form of financial independence through wages.

The author noted more cases of extreme forms of contestations among the Maasai women who lived in the rain-fed zone. Maasai women in the rain-fed zone are more engaged in crop farming than the Maasai women in the irrigated zone. The women are at a stage where labour allocation by gender is at its most dynamic, and therefore also at a stage where a lot of negotiation takes place. This is probably the reason why running away was most common within this group.

## 7. Conclusion

This study explored the linkages between gender division of labour and land use change within the feminist political ecology theoretical framework. The study also borrowed from the closely related feminist environmentalism theoretical framework. The findings of the study reinforce the central arguments within both theoretical frameworks. The study found that local changes in land use and gender roles are influenced by an interaction of social, ecological, economic and political forces, acting at a variety of scales from local to global. SAPs, the national land reform and ecological forces influence land use decisions made by farmers in Oloitokitok Division. Land use decisions in turn have implications for gender roles. This study found that land use alone is not enough to explain the changing gender roles that are observed in the division. Social forces such as interaction with other communities, the changing value of formal education, conversion to Christianity, and the changing structure of dwelling units have all contributed to change the roles that women and men have in the households.

The study found spatial patterns in the way men and women use the land, that have persisted since in the 1930s. In the 1930s, range grazing was the dominant activity in almost all Oloitokitok households. Range grazing was predominantly done by the men. During this time, women took care of the sick and young livestock that were left at the homestead when the rest of the livestock went to graze on the range. Currently, range grazing is slowly being replaced by zero-grazing, and grazing close to the homestead. These methods of grazing are primarily confined to areas within or close to the homestead. Over time, the dominant locality of the livestock has been transferred from the range to areas closer or within the domestic locale, and consequently from the care of the men into the care of the women. An analysis of the historical patterns of grazing therefore reveals patterns of gendered use of the landscape that have not changed very much, despite major shifts in animal husbandry techniques and types of livestock kept.

Integration into a cash economy and increasing focus on cash crop farming has changed the gendered spatial patterns of marketing. In pre-colonial times, women were engaged in long distance travel for trade purposes (Spear & Waller 1993). Exchange was through barter trade as the monetary system was not yet in place. Women would trade livestock products for crop products to supplement their diet. Currently men are the ones primarily engaged in long distance trade travel than the women are. While men travel as far as Mombasa to sell crop produce, women only travel to markets within the division to sell their crops. Crops sold by men are usually grown specifically for cash, while crops sold by women constitutes the surplus of the food crops they produce. Like crop marketing patterns, livestock marketing patterns also shows variation in the distances that men and women travel, and in the types of livestock sold. Men primarily sell cattle, sheep and goats at livestock markets within the division. Women on the other hand can only sell poultry, as these are the only livestock that they have complete control over. Poultry sales are rare, and they primarily happen within the homestead.

Feminist environmentalism and feminist political ecology framework demonstrate the importance of treating gender as a critical variable in studies on resource control and access. The results of this study reveal the differences in labour time allocation between men and women and contribute to information on linkages between gender roles and agriculture. Boserup's monumental study (Boserup, 1970) analyzed the sexual division of labour in several countries and concluded that in areas of intensive, irrigation-based cultivation, both men and women share equally in agricultural tasks. This study finds this not to be the case in the irrigated lowlands of Oloitokitok Division. Men spend more time than women do in activities related to irrigation in Oloitokitok Division. This difference from Boserup's findings can be explained by two factors. First, irrigation activities are perceived by the men to be too difficult for women, and the men therefore chose to perform them. Secondly, crops grown on irrigated lowlands are mostly grown for cash. The tendency in Oloitokitok Division

is for men to control property that have high use and exchange value. Men have therefore relegated the care of livestock to women as livestock have declined in exchange value, and focused on cash cropping for its higher exchange value.

Boserup (1970) also concluded that in areas of dense population where ploughs and other simple technologies are used, men do most of the work. Again this was found not to be the case in Oloitokitok Division. On the highland areas where population densities are high and farmers use simple technologies, there were no significant differences between the time that men and women spent on crop production. This can be explained by the fact that unlike in many densely populated rural areas, Oloitokitok Division has had minimal male out-migration. Male labour is therefore still available for utilization in agricultural production.

Guyer (1988b, 1990, 1992) carried out extensive studies on gender roles in western Africa and concluded that women's activities are dominated by the symbolism of bending. Guyer's findings are supported by Burton and White (1984), and Iduwo and Guyer (1991). The results obtained in this study show this not to be the case. Weeding and field preparation are two activities that Guyer, Burton and White, and Iduwo and Guyer attribute to women. In this study, men were found to spend significantly more time in field preparation than women did. This study found no significant difference between the time that men and women spend on weeding. These differences in findings could be related to the lower male out-migration in the study area.

In sub-Saharan Africa and the Middle East, women have been documented to play an important role in poultry production (Gueye, 2000; Niamir-Fuller, 1994), in raising 'minor' animals such as sheep and goats (Fratkin & Smith, 1994; Niamir-Fuller, 1994; Turner, 1999), and in the control of milk and milk products (Kipury, 1989; Mitzlaff, 1994; Niamir-Fuller, 1994; Steinmann, 1998; Talle, 1988/1994). The results of this study qualify all of these findings and go a step further—women are also playing a major role in raising sheep and goats and even collecting fodder for cattle. My results indicate that women supply more of the labour required in livestock production than the men. This evolution in care of livestock towards women, and in crop production towards both men and women, appears to be related to sedentarisation. Sedentarisation in Oloitokitok has occurred as access to former communal grazing land has declined, and as incomes have rapidly diversified towards rainfed and irrigated cropping. These changes in lifestyles towards sedentarisation are similar to what Fratkin and Smith (1994) and Nduma, Kristjanson and McPeak (2001) found among the Rendile of northern Kenya. Among the Rendile, sedentarisation presented new economic opportunities for women, through the sale of agricultural produce, milk and labour in neighbouring towns. Thompson and Homewood's (2002) study among Maasai communities adjacent to the Maasai Mara National Reserve found that sedentarisation had led to income diversification towards farming, wildlife tourism and large scale cereal cultivation. Similar patterns were found in pastoral communities in southern Ethiopia (Little et. al., 2001). Cultural or social influences on gender roles and relationships in Oloitokitok include the teachings of Christian churches, for example against wife beating, and the effects of formal primary education. These economic and social forces in Oloitokitok have, as this research documents, already led to major and probably permanent changes in gender roles and relations.

During my research, I did not come across another study that has attempted to quantify the labour time used in all the activities of livestock production. The results that women are, in general, providing more labour in livestock production than men in the study area are therefore a major contribution to the literature on gender and pastoral production systems.

Political ecology recognizes the importance of understanding power relations of production and how resource access and control (including the labour resource) are tied to power struggles at household to national levels. Feminist political ecology recognizes the

importance of investigating power relations within the household, their gendered nature, and the meaning for gendered resource access and control. This study found that the household is a site of contestation as men and women struggle for the control of women's labour. Reinforcing arguments from feminist environmentalism and in particular supporting Boserup (1976) findings and Durkheim (1984) theory of organic solidarity, this study found that the ultimate concern when labour time allocation decisions are made within the home, is household survival. Unlike the findings of Carney (1988, 1996), Carney and Watts (1990, 1991) and Schroeder (1999), this study finds the household to be more a site of cooperation than it was a site of conflict. The study demonstrates the role blurring that occurs in households that have been farming long enough to move beyond the teething problems associated with new activities. Farmers explained that 'everybody does everything' as the collective common goal is household survival.

Conflicts that occur over the control of the female labour are not about the labour, but more about resources produced by the female labour. When resources generated from household female labour are used for the benefit of the entire household, no conflict arises. Conflict arises when men, who control resource distribution in the households, misappropriate resources generated by the household's collective labour. Women continue to contribute their labour to cash crop and livestock production, even though men control the money earned from these activities, because labour contribution gives the women an edge in the process of negotiating for the allocation of resources by men in the household. Women who do not contribute their labour in the production of resources that are later converted to cash are culturally not expected to contest the use or distribution of the resource or cash. When women choose to contest resource allocation by men, the methods they choose show sophistication in their timing, cultural acceptability and involvement of opinions and support beyond the household. The overall objective of female contestation is closely tied to their material concerns for household survival. This is in keeping with the central theme of feminist environmentalism.

The results of this study have important implications for agricultural development programmes in pastoral communities. Livestock development programme officers need to recognize the gendered nature of labour allocation and even more importantly, the significance of women's labour in livestock production. The failure of livestock development projects have been attributed to the neglect of the role of women in livestock production (Hodgson, 2000; Kettel, 1992). Livestock development programmes need to be formulated with the importance of women's roles in mind. For example, since women are increasingly engaged in activities associated with cross-bred and exotic livestock (e.g. watering, collecting fodder, collecting manure), livestock development programmes that advocate a shift towards cross-bred and exotic livestock will increase their chances of success if women's opinions are incorporated from the beginning. This is likely to be a challenge because in many pastoral societies, men own the livestock and subsequently make decisions regarding livestock. Livestock development officers need to actively seek and engage women in the spaces that women feel comfortable to express their opinions. The popular format of general community meetings does not always provide the appropriate setting for women's voices to be heard. Usually women do not attend general community meetings, and when they do, they remain silent. Women's only meetings would be more appropriate than general community meeting. During such meetings, women's time demands and availability for participation in livestock development projects should be addressed.

The results of this study also have important implications for natural resource management. There are many natural resource management projects that rely on local labour availability for their success. Examples range from wildlife community conservation efforts (Western and Wright 1994) to village forestry programmes (Maathai 1988). It is important for those involved in formulating such projects to recognize that both men and women's labour is already highly committed to crop and livestock production. The need for food and money to

meet health and education needs is a large factor influencing decisions on where labour is allocated. Natural resource managers relying on local labour inputs need to recognize this fact while formulating their projects. Natural resource management needs to be understood as a land use competing for land and labour with such land uses as crop and livestock production, and subsequently designed so as to provide short term economic gains to land and labour investment.

This study demonstrates the importance of multiple scales of analysis in understanding issues relating to gender and linking those issues to the landscape. The study relied on an integration of data collected at landscape scale, household scale and individual scale. Each scale of analysis revealed information and relation patterns that were obscured at other scales. The secondary data derived from remote sensing was useful in providing information on broad patterns of land use and land cover conversion patterns. The study could however not get information on land use modification patterns and specifically changing cropping and grazing patterns at the landscape scale of analysis. The study relied on data collected at the household level to get information on land use modification patterns. The study relied on data collected at individual level to get information on the use of farm space at household level and its gendered nature. Gendered landscapes are invisible at the dominant scale of analysis used in land use and land cover change studies (for example Campbell et al. 2003, Campbell 2003, Meyer et al. 1992, Ojima et al. 1994, Turner et al. 1990). Gendered landscapes occur at the spatial scale of the farm and they can only be recognized through detailed field studies that treat gender as a critical variable.

At community level division of labour seems to be related to stereotypical differences that community members say can be found between men and women. For example, farmers referred to the muscular strength of men in relation to male domination of irrigation. Farmers also referred to men's bravery and superior expertise in negotiation and conflict resolution in relation to the domination of sale of farm produce in far away places. But analysis of data collected from men and women at individual levels revealed male domination of irrigation and the sale of crop produce to be linked to the control of the means of exchange. Irrigation is the main income generating activity for most farmers in the Oloitokitok Division. Control of the technology and the sale of the produce put the control over the main means of exchange in the study area in the hands of men. Analysis at individual level also revealed the preference that women have of particular food crops and how this contributes to the gendered landscapes observed at farm level.

The success of multiple scales of analysis is closely tied to the use of multiple methods of data collection and analysis. Much of the literature on land use relies on the collection of quantitative data from remotely sensed imagery (Campbell, 2003; Campbell, Lusch, Smucker, & Wangui, 2003; Meyer & Turner, 1992; Ojima, Galvin, & Turner, 1994; Turner et al., 1990). The methodology in this study was built of careful triangulation of quantitative, qualitative and participant observation. This flexible combination of methods revealed the gendered structure of labour allocation in the households and their linkages to land use on the farms. The quantitative data yielded important numbers on labour allocation patterns and allowed the study to test whether differences between men and women were significant. Quantitative data allowed the study to test for differences between what was actually happening and what people's perceptions of labour allocation patterns were. The study found that in livestock production, both men and women underestimated the amount of time that women spend on livestock production. Men and women were asked to make a quick comparison on their labour time allocation in livestock production, they all said that although women are doing more than they used to in the past, men were still doing more. The quantitative data collected at individual level revealed the opposite to be true. Qualitative data and participant observation were both vital in understanding the complex relationships between men and women in the production process.



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