

**Bangor University**

## **DOCTOR OF PHILOSOPHY**

**Livestock production and food security in a changing socio-cultural environment due to involuntary relocation of agro-pastoralists into semi-arid areas of Makueni District, Kenya.**

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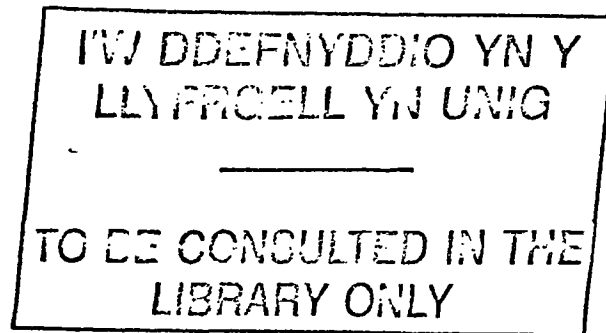
**LIVESTOCK PRODUCTION AND FOOD SECURITY IN A CHANGING  
SOCIO-CULTURAL ENVIRONMENT DUE TO INVOLUNTARY  
RELOCATION OF AGRO-PASTORALISTS INTO SEMI-ARID AREAS OF  
MAKUENI DISTRICT, KENYA**

A THESIS SUBMITTED TO THE UNIVERSITY OF WALES

BY

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## DEDICATION

This thesis is for my wife, Eunah, and my sons and daughters, Cleopas, Dadson, Isaac, Jonathan, Monicah and June. I am everlastingly grateful to Eunah for letting me set about the study, something that I should have undertaken at a younger age should this chance have been made available to me then. I acknowledge that she has suffered greatly from my absence in Wales and in the study settlement location but has not complained. The mutual support which existed between her and our fledgling children throughout can not be attributed to any other source than a divine one deserving of JEHOVAH GOD'S unreserved credit for providing me with an understanding and cooperating family. (*1 Corinthians 11:3; Ephesians 6:1-4; Proverbs 31: 10, 11, 28*) This also is deserving of my deep heartfelt and loyal recognition.

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## SUMMARY

The literature on Human Resettlement and the socio-economic adjustment processes involved has been reviewed with special reference to planned and unplanned relocation and how models of social change apply to them. As a result of the findings of this study the investigator has concluded it by developing a unique **5-Step Socio-Economic Change Model** based on the unplanned involuntary relocation of agro-pastoralists within the semi-arid areas of Kenya.

A study of the Kenyan resettlement at Muuni was carried out over two growing seasons in 1997/98. Detailed information on the social structure prevailing and of the social and economic practices was gathered. This information was supplemented by data recorded on the agricultural activities of a sample of 30 farming households, each having 10 acres of land. This information was supplemented by data on rainfall and soil type. Income from non-farming activities was also gathered.

Data has been summarised and analysed and results discussed in the light of previous findings.

Among the principal findings were:

- That the role livestock production plays in socio-economic processes of change in semi-arid areas of Makueni District became secondary or even tertiary following change of land tenureship by relocating agro-pastoralists from areas of communal use of forage and water resources to small-scale private land holding areas.
- That failure to plan the involuntary relocation of the approx. 1000 households involved had placed them in difficult circumstances.
- Hardship was the result due to failing to appreciate the inadequate potential of the limited private areas allocated and/or to provide a sufficient water supply in the resettlement scheme.
- That failure to plan for suitable livestock disease control measures, medical care and education in the area imposed additional burdens on the people.
- That the people proved capable of alleviating their conditions and meeting short-term needs by undertaking a range of non-farming activities and by collaborating at critical times in the farming and other social cycles.
- That the delayed issuance of land title deeds to the farming households placed the families in an inequitable position and restricted their right of free movement.

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## **PREAMBLE:**

In 1992 the Government of Kenya decided to resettle Kamba families who had, about five years before, been evicted from their familiar dwellings in the Chyulu Hills and Kalembwani area. There was also another small relocated community originating from Kibwezi area but this one was not evicted, it was persuaded to leave. The land identified for resettlement belonged to the Kenya Agricultural Research Institute (KARI) situated at National Range Research Centre (NRRC), Kiboko, Makindu (Figures 2 and 3). After consultations between the government and KARI Board of Management, the Government decided to adjudicate about 10,000 acres (4,050 ha.) from this institute's land. The land was then consolidated and registered to the community which forms the basis for this study. Each household was allotted about 4 hectares regardless of their former socio-economic and land tenure backgrounds. No attempt has been made to grant land title deeds to the respective householders and thus any land sale is illegally done. These households had come from a variety of background but were predominantly Kamba people.

It was alleged that the Chyulu group was evicted because it occupied a water catchment area vital for the communities living down-hills. The Kalembwani group was evicted as a result of ethnic disputes between them and the Maasai people whose forage and water resources they had mutually used for a long time. The Kibwezi community was persuaded to leave because they and their livestock had become a nuisance to the Kibwezi township and the District Officer, respectively.

The Chyulu group was relocated from an area of relatively higher agricultural potential due to favourable climate and vastness of the natural resource base. According to Jaetzold (1983) this area receives an annual rainfall of 700-800 mm. The Kalembwani group was relocated from an area of relatively low annual rainfall (600 mm) but where for a long period (about 40 years) they had exploited the vast forage base to increase their livestock number and also had tilled the land to improve household food status. The Kibwezi group considered it a privilege to have been moved from a shanty-like village life where they had exploited a scanty forage base growing on an area of lava flow, to a status where they could own private land. The ecological zonation for Kibwezi and

Muuni settlement scheme is the same although Kibwezi has a favourable niche as a result of a good high water table that supports river-line vegetation and agriculture. However, the prime river-line base was not available for the Kibwezi community discussed in this study.

In the case of the Muuni settlement scheme, the area where these three groups were resettled is considered "Lower Midland" with rainfall 600-750 mm, an area of low agricultural potential but good for livestock keeping under proper rangelands management principles.

The primary aim of this study is to investigate and improve our understanding of the role livestock production plays in socio-economic processes of change in semi-arid areas of Kenya with particular reference to Muuni Settlement Scheme situated in Makueni District. The field study covers a period of about two years (September, 1996 to June, 1998). Figure 1 shows the arid and semi-arid areas of Kenya, whereas figures 2 and 3 show the areas pertinent to the study. Table (i) shows the university and field study events relevant to the project.

Figure 1. A Map of Kenya showing the proportions of land occupied by arid and semi-arid, and arable areas as well as the study District of Makueni located within the former proportion, Kenya, 1997.

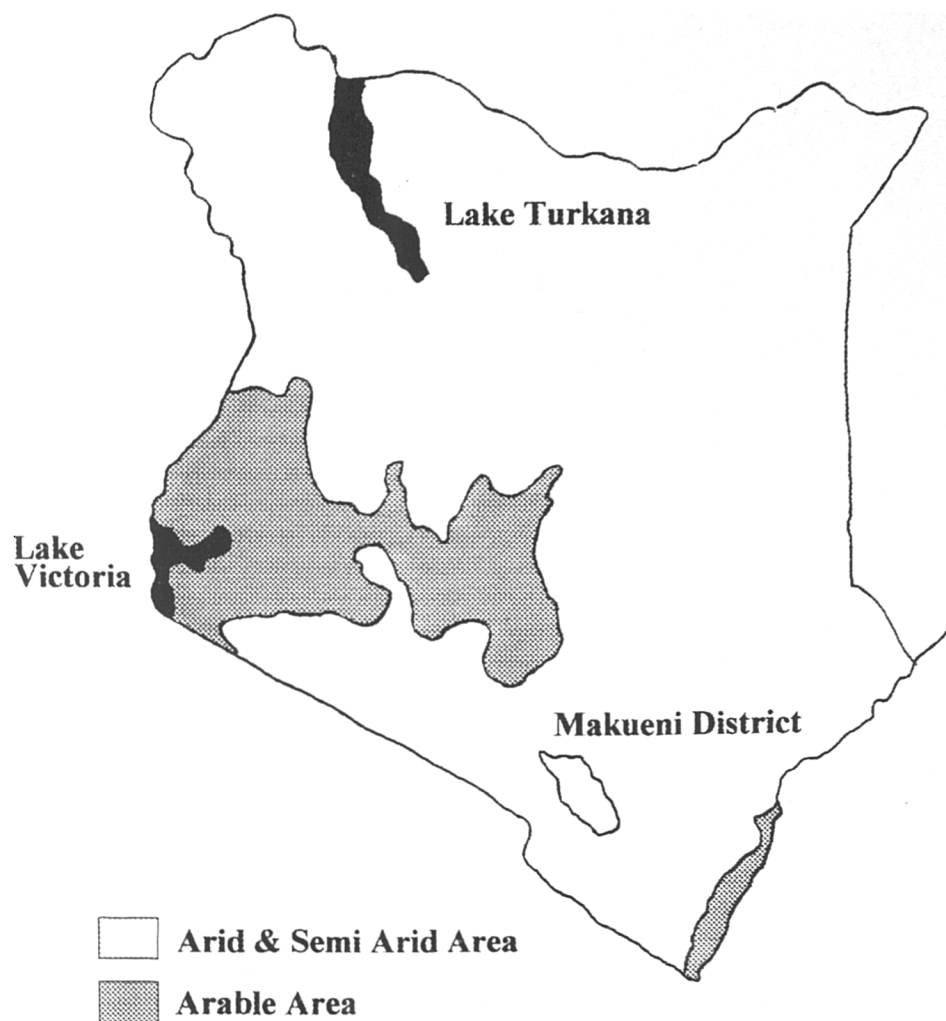


Figure 2. Map of Kenya showing her location in Africa, her neighbouring countries, the study District of Makueni and the key areas mentioned in the study, Kenya, 1997.

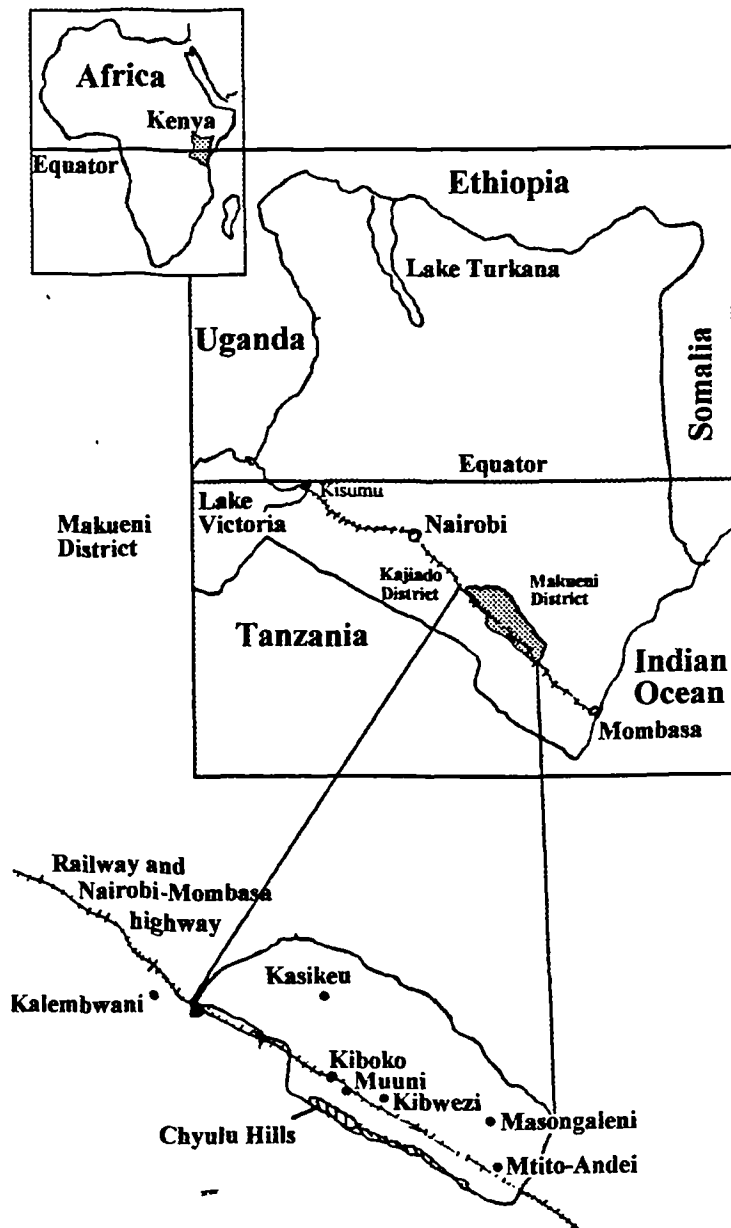


Figure 3. A Map of Makueni District showing the KARI, Kiboko National Range Research (NRRC) land from which Muuni Settlement Scheme was adjudicated and the distribution of the 30 study responding households, Makueni District, Kenya, 1997.

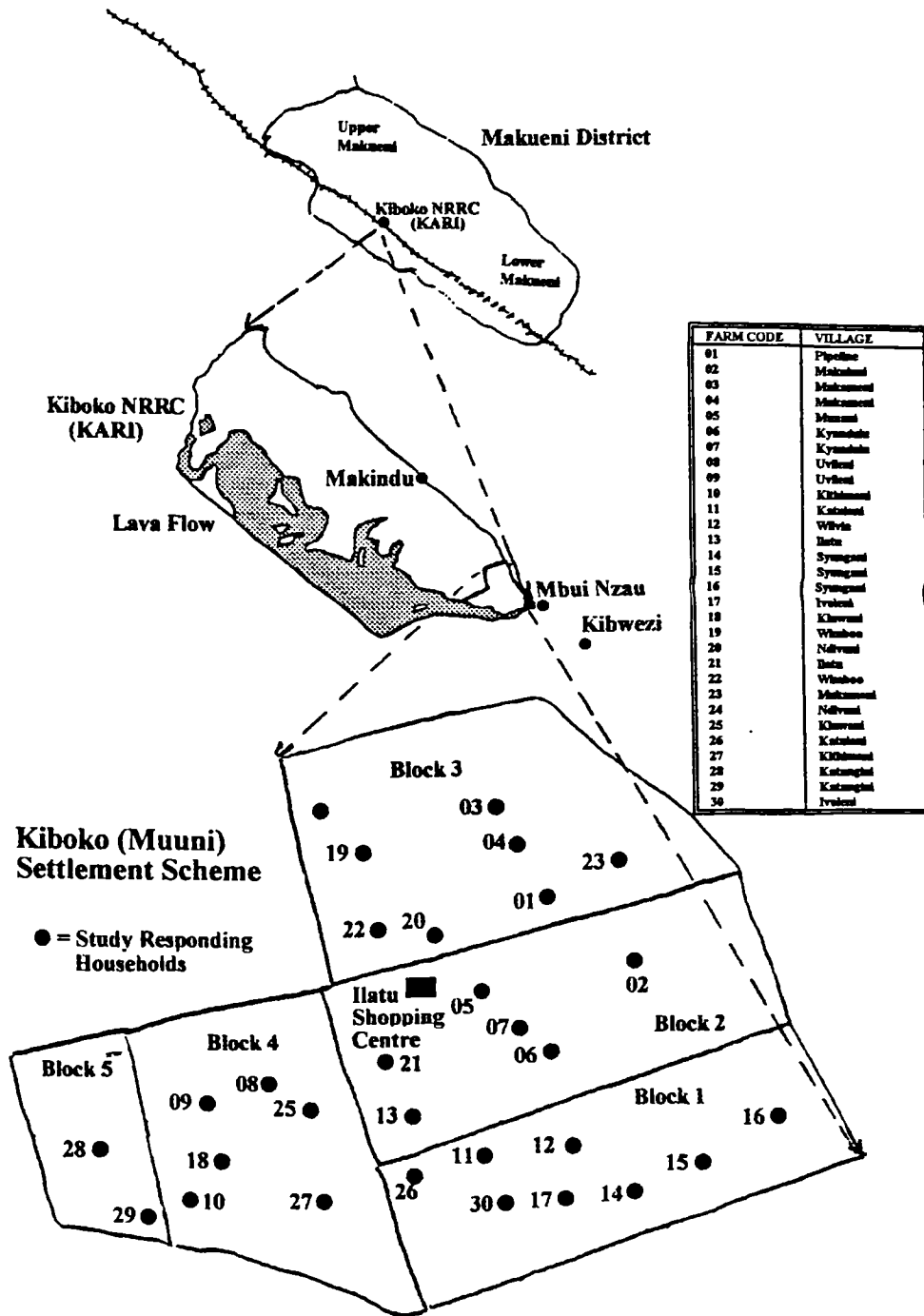


Table (i). University and Field study Events, PhD Study, University of Wales, Bangor, UK, 1996-1998.

DATE	ACTIVITY	LOCATION
Jan.-Feb., 1996	Directed social study references	Nairobi and Kiboko, Kenya
Feb.-Aug., 1996	-Literature review and directed modules -Visit of ODI Library -Consult with Dr. Jules Pretty	University of Wales, Bangor, UK. London, UK
Sep.-Nov., 1996	-Family reunion -Transport and Field budget logistics -Visit District Surveyor -Visit local extension, administrative staff and farmers	-Nyeri District -KARI Headquarters, Nairobi -District Headquarters, Wote -Makindu, Kibwezi and Muuni
Dec., 1996	-Draw Field study Budget plan -Discuss study material delivery logistics	-NRRC, Kiboko -KARI Headquarters, Nairobi
Jan-Mar., 1997	-Preliminary overview study of the Muuni community and their production resources -Identification of the study respondents -Preliminary data organization and recording and drawing monthly budget -Recording exercise commences -Recruiting and training field technical assistants	-Muuni settlement scheme
Jul.-Sept., 1997	-Monitoring of the recording exercise -Summary of the records and computer recording -Visual observation of social and production activities	-Muuni settlement scheme -NRRC, Kiboko
Oct.,-Dec., 1997	-Monitoring of the recording exercise -Summary of the records and computer recording -Visual observation of social and production activities	-Muuni settlement scheme -NRRC, Kiboko



Table (i). Cont'd.

<p>Jan.-Apr., 1998</p>	<ul style="list-style-type: none"> <li>-Recruitment of the 30 case studies</li> <li>-Case study interviews</li> <li>-Monitoring of the recording exercise</li> <li>-Summary of the records and computer recording</li> <li>-Visual observation of social and production activities</li> </ul>	<ul style="list-style-type: none"> <li>-Muuni settlement scheme</li> <li>-NRRC, Kiboko</li> </ul>
<p>May-Jun., 1998</p>	<ul style="list-style-type: none"> <li>-Field data preparation and packing</li> <li>-Field equipment retrieval and transport logistics</li> <li>-Belief family reunion</li> <li>-Medical check-up</li> <li>-Visa and flight logistics</li> <li>-Travel to Bangor</li> </ul>	<ul style="list-style-type: none"> <li>-Muuni settlement scheme</li> <li>-NRRC, Kiboko</li> <li>-KARI Headquarters, Nairobi</li> <li>-British Council</li> <li>-British High Commission</li> </ul>

# **CHAPTER 1.**

## **CONCEPTUAL, THEORETICAL AND METHODOLOGICAL FRAMEWORK**

### **1.1. Introduction**

This chapter considers the conceptual ideas and methodologies applied in order to achieve the study goals. For anthropological studies qualitative research methods were employed. Quantitative methods were used for direct measurement of production-related data wherever possible.

Focus groups were very useful in this study in that very little was known about the Muuni community and this called for an exploratory approach for which focus group groups and single subject interviews were designed. (Adak, 1996; Pelto, 1978; Pretty, 1995; Stewart, 1990 and Mwiria, 1995, Bernard 1995; Babbie,1983). Semi-structured interview techniques were employed especially with single subject interviewees. As Singh (1994) indicates, standardised interviewing proved to be very useful to maintain even handedness with interviewees

### **1.2. Conceptual and Theoretical Framework:**

Agropastoralism has been defined by McCorkle (1992) as, any system of mixed crop and livestock production in which herd animals derive a portion of their diet whether directly or indirectly from plant crops, crop residues or by-products, or fallowing fields. She also says that while there has been attention paid to the crop and animal science aspects of agro-pastoralism, researchers have tended to ignore the complex social, cultural and political-economic dynamics of these systems. In the Western view, the livestock sub-sector of agro-pastoralism is often considered to be inferior to the crop aspect, often due to the small size of herds. However, in the Third World, even small herds can play many diverse and valuable roles for the people who keep them. Research on agro-pastoral systems is difficult and complex. Not only must one study both the crop and livestock aspects, but also the interface where these two subsystems meet in the household economy. Further this interface, or "Agro-pastoral nexus" according to McCorkle, (1992), creates both complementarities and trade-offs in terms of the

ecological, technological, economic and social aspects of the system. These complementarities and trade-offs will be investigated for the community under study as part of the proposed research.

As stated, keeping livestock is a particularly important strategy for resource use in semi-arid lands (SALs). In the past, cattle, goats and sheep supported the livelihood of pastoralists and agro-pastoralists. Food production was always considered secondary to livestock keeping. In terms of importance, cattle were considered priority animals because of the many roles they played in meeting various household subsistence, economic, social and customary needs. These included: provision of food (milk, meat, blood, ghee), use as draught animals for cropland preparation and transport, and use as a basic unit for social exchange. Other uses might include provision of manure for fertiliser and fuel, and hides clothing handicrafts and household items. Elaborate, extensive grazing systems existed and were based on seasonal (wet-dry) grazing patterns within a communal grazing ethic.

Resettlement in the SALs has increased human pressure on these ecologically dynamic, non-equilibrium-based ecosystems (Scoones, 1995 and Ellis, 1995). This has made it necessary to change/review their economic and social needs. Resettlement seems to have interfered with traditional pastoral and agro-pastoral production systems, social systems and customary institutions. For example, grazing patterns are disrupted as human and livestock population densities increase. Similarly, change in land tenure is affecting the familiar agro-pastoral and pastoral systems. As a result, dryland farming is being introduced and livestock production systems are changing in the following areas: grazing and water patterns, species composition, herd/flock size and structure, livestock breeds kept, labour input, product use, management techniques and marketing. All these changes need to be investigated much more closely if organisations charged with agricultural technology research and development such as KARI are expected to plan for appropriate technologies to address the question of food security among many other economic and social problems emerging as resettlement continues to take place in semi-arid areas.

In the 1960s and 1970s rural-rural migrations into semi-arid areas of Kenya have been mainly voluntary. However, involuntary relocation (or resettlement) has also featured prominently in Kenya's recent landuse history. But it is important to note that human resettlement can also be regarded as either planned or unplanned, depending on the degree to which governments or other agencies make provisions for services to assist people with the move and subsequent adjustment to a new area. In Kenya, most relocations where outside agencies have played a significant role have been of the former type. The relationship between the nature of recruitment to resettlement (voluntary or involuntary) and the degree to which agencies outside the relocated community provide for adjustment to resettlement (planned or unplanned) creates a typology of resettlement that can be represented by Table 5.

The social implications of resettlement have been the object of much recent study by anthropologists and others (Cernea and Guggenheim 1993). A model of social change during the resettlement process widely used by scholars and policy makers is that devised by the anthropologist Thayer Scudder. McMillan (1995) in a recent book describes this model as a four-stage resettlement process which migrant individuals and groups undergo in order to adjust to their new situation. Scudder's Stage One is a **Planning/Recruitment, Initial Infrastructure Development and Population Transfer** stage. This period precedes the actual transfer of people to the new settlement area. Stage Two is called **Settling-In and Transition**. During this stage, Scudder argues that most settlers will adopt a conservative stance (towards subsistence and social change), their first priority being to meet their subsistence needs. They favour continuity over change and where change is necessary they favour incremental change over transformational change. Where possible, they cling to the familiar by moving into new settlements with relatives, former neighbours and co-ethnics. They also try to transfer area-of-origin house types, farming practices and other skills even though they may not be suited to the new habitats.

In Stage Three, **Economic and Social Development**, there is a shift from a conservative, risk-adverse socio-economic orientation to a more dynamic, open-ended, risk-taking one as settlers produce sufficient food to meet their subsistence needs and feel

more comfortable with their surroundings. At this stage, there is more investment in land, cash cropping, inputs for crops (and presumably livestock production) and education for children. The fourth stage, **Handing Over and Incorporation**, is signalled by the take-over of administration by local leadership and the incorporation of the settler community into the region.

Those who have used Scudder's model to study the sociology of resettlement have concentrated mostly on planned situations where government intervention has provided support services. Processes of social adjustment under conditions of voluntary planned resettlement (Type A) have been studied by McMillan (1995) in Burkina Faso as part of the AVV scheme to resettle people from the Central Mossi Plateau in previously unsettled areas that were freed of river blindness. De Wet's (1994) study of a villagisation programme among the Xhosa in South Africa is an example of resettlement that is planned but involuntary (Type B). A situation where resettlement was voluntary but unplanned was studied in Makueni District, Kenya by Gitunu (1994) with people moving from northern high-potential agricultural areas (Kasikeu Location) to southern lower-potential areas (Mtito-Andei Location). It is important to note that, whereas McMillan and De Wet used the Scudder's model to some extent to analyse the social consequences of relocation, Gitunu did not directly apply the model to his analysis.

Application of Scudder's model to resettlement situations of Type D (involuntary, unplanned) has, to the best of my knowledge, not been attempted to date except for cases involving refugees. An evaluation of the possibility of the model's applicability to involuntary unplanned resettlement situations in the SALs in relation to this study has been assessed and discussed in chapter 8.

However, it is important to note that Scudder's model has its limitations even when it is applied to relocation types for which it has been designed. For instance, de Wet (1993) in his study of planned resettlement in South Africa says that while it may tell us that resettled people generally tend to behave in more dynamic and diverse ways, the model may not help us to explain the particular form those diverse responses take. He further suggests that we need an approach to the analysis of relocation which is able to account in greater detail for the nature of peoples' reactions to involuntary relocation.

He contends that relocation involves movement of people from one place to another and that this brings about a change in the spatial setting. Such a change has both physical as well as socio-economic implications for the relocated people since it involves them in new sets of socio-economic-political relationships. So de Wet suggests a focus on this element of spatial change in order to provide us with a means of accounting in greater detail for the similarities and differences in peoples' responses to relocation.

This study takes Scudder's model as a starting point for investigation of the social and landuse behaviours (particularly livestock production) of Muuni community formed as a result of unplanned involuntary resettlement in Makueni District of Kenya.

### **1.3. Objectives and Areas of Investigation:**

1. The primary objective of the thesis is to improve our understanding of the role livestock production plays in socio-economic processes of change in semi-arid areas of Kenya.

The research has the following specific objectives:

a. Understand changes in the role of livestock in the subsistence pattern, its contribution to household income and food security in relation to crop production and off-farm activities.

b. Analyse changing social relations between individuals and groups which result from relocation to semi-arid areas and the consequent modification of the subsistence systems;

c. Document changes in individual and group values and attitudes towards animal husbandry as part of the adjustment process.

d. Determine the food security status of households as a result of the adjustment process.

Given that the Kiboko community had only been settled for three years at the start of my study, it would be reasonable to assume that the community is currently in Stage Two of Scudder's model. Assuming this to be the case and that the model would apply, we would expect that the settlers are currently undergoing stress and adjustment in various areas in adapting to their new agricultural, economic and social environments. The study has investigated variations in landuse and social organisation of the community

between the time they were in their pre-relocation areas and during their resettlement period at Muuni and also among households within the resettlement community. This variation has been observed in the following areas:

**Changing Nature of Livestock Production as indicated by variation and change in:**

1. Size, composition and structure of household herds/flocks;
2. Grazing and watering patterns and distances travelled;
3. Patterns in marketing of animals and livestock products;
4. Livestock management practices; e.g., labour inputs (household vs. hired labour), use of feed supplements and disease control technologies.
5. Livestock welfare challenges (e.g., theft, diseases, adaptation, predation and nutrition.)
6. Changing nature and importance of crop production, and differences in approach to crop production between households.

**Changing Nature of Social Organisation as indicated by variation and change in:**

- Social organisation of work (esp. crop and livestock management) by gender (and other categories) at the household level;
- Intra-household decision making and control over productive resources and products (esp. livestock);
- Inter-household interaction in areas of sharing livestock and other products (e.g., milk sales, manure sales, crop residue, pasture hire, livestock boarding, access to resources such as natural mineral licks and water trespass issues, self-help and affiliation groups interested in livestock development).
- Cases of land sale by household heads and the consequent fate of the other family members.

**Changing Cultural Values as indicated by variation and change in:**

- Change in dietary habits, esp. as related to livestock products (e.g., increased mutton consumption, milk consumption, milk replacers such as sorghum and millet porridge, livestock slaughter rate, importance of other livestock species such as rabbits,

chicken, ducks, etc., and the change in taboos relating eating some livestock products and not others).

- Distant kin reliance and formation of other social networks
- Inter-ethnic group interactions
- Adjustment of customary law systems to suit formal law (trespass into someone's properties, stealing and illegal grazing)

**Changes in Household Food Security as indicated by variation and change in:**

- Amount of grain sold vs. stored for future use
- Patterns of food purchases
- Reliance on famine relief of food aid (WFP)
- Diversification of agriculture as evidenced by: gardening (Shirley, 1995), raising non-traditional livestock, land leasing for crop growing and livestock grazing, etc.
- Contacts with agencies promoting food security measures such as extension services, NGOs and church groups.

**1.4. Methodology, Approach and Sources of Data:**

The study has utilised a variety of qualitative and quantitative methods to generate information from the relocated community. Prior to the commencement of field work, relevant background literature such as government reports and previous research (e.g., MSc. theses, and published journal articles) were extensively consulted. For field research, qualitative data has been used to address research questions wherever appropriate. The following are the data/information collection methods used in the course of study.

**1.5. Focus Group Interviews:**

Focus group discussions were designed based on sex and area of origin of the community. (Stewart, 1990; Pretty, 1995 and Adak, 1996). Two main areas of origin of the community were identified. These were Chyulu Hills and Kalemchwani areas. A third but minor area of origin was known as Kibwezi. Only a few people originated from this



area. It was difficult to form a focus group from this community since their numbers and distribution within the scheme was too low. Instead, single subject interviewees were identified from this community.

Focus group discussions focused on four main areas of study.

- Changing nature of livestock production
- Changing nature of social organization
- Changing cultural values
- Changes in Household food security

For each of the above four areas, two focus group discussions were formed, one for men and the other for women

In total there were sixteen focus group discussions of which eight of them were based on men and women originating from Chyulu hills and the other half from Kalembwani area. In addition to focus groups, eight single subject interviews were formed based on men and women who had originated from Kibwezi area. Each interviewee responded to questions asked from the four main investigation areas shown above. Both group discussants and single subject interviewees were encouraged to discuss their status pre- and during resettlement.

Kiboko Settlement Scheme which I shall call the 'Muuni Settlement Scheme' for convenience, is delineated into five settlement blocks. These are numbered from 1 through to 5. Each block is composed of a number of villages. In total, there are seventeen villages and each village has a leader popularly known as the village elder. Table 1. shows the scheme set-up.

Table 1. Muuni Settlement Scheme by Block, Village, Village Elder and Households. Muuni Settlement Scheme, Makueni District, Kenya, 1997.

HOUSEHOLDS PER BLOCK		1	2	3	4	5
ELDER	VILLAGE					
Masia Mutungwa	Katulani	44				
Elijah Kyumwa	Ivoleni	41				
Mutava Kituku	Syungani	60				
Kimuyu Ndeti	Wiivia	71				
Kisowe Ndoi	Muamba Nzuki		51			
Maweu Ndolo	Ilatu		63			
Mbova Mulai	Kyandulu		42			
Paul Kitili	Makuluni		50			
Philip Kitingo	Mukameni			43		
Samuel Musomba	Ndivuni			57		
Maweu Musa	Ngusyini			31		
Willy Munyaliti	Pipeline			47		
Lumbo Kinai	Wimboo			46		
Kasuva Ndambuki	Uvileni				41	
David Wambua	Kiuwani				43	
Kanyai Kalingi	Kithimani				43	
Ngile Ngumba	Katangini					53

In order to have a fair coverage of the whole study area in selecting focus group discussants, effort was made to put all blocks, villages and population into consideration so that each block and village would be represented in the discussion. The same thing applied to the choosing of the single subject interviewees who originated from Kibwezi. Five local field assistants composed of males and females received training in order to assist in focus group management and interviewing. Focus group discussion pre-testing was done in Kaunguni area, a community situated about 15 kilometers away from Muuni settlement scheme.

#### 1.6. Semi-Structured Interviews of Key Informants:

Under this method, key informants were considered to be village elders who were understood to be quite conversant with whatever was going on in the scheme. All the seventeen village elders were interviewed and asked to give their views and understanding of the scheme based on the four main investigation areas mentioned above.

Other interviews falling under this methodology include:

### **A Single subject case study interview.**

For this inquiry, thirty households were selected, fifteen from Chyulu and the other half from Kalemwani. From each group, five out of fifteen were women. Questions based on their status in the following four stages were asked:

Stage 1. Pre-movement situation

Stage 2. Movement situation

Stage 3. Resettlement situation

Stage 4. Present situation

Under the above four stages efforts were made to obtain information relating to the settler's farming systems, work organisation, family structure/relations, Neighbour relations, social groups and their workings and people's satisfaction. As much as possible, interviewees of all walks of life (farmers, business, religion, employees, witch-doctors etc.) were included in this inquiry. As mentioned earlier, single subject interviewees originating from Kibwezi fall under this methodology.

#### **1.7. Visual Non-verbal Approach:**

This method was used to estimate pre- and post-relocation herd and flock sizes, composition and structure; determine number and occupation of non-Kamba ethnic groups; rank Kamba food dishes; and show types of social disputes and their solutions. Respondents placed maize seeds on a designed sheet of paper to indicate their perceived response.

#### **1.8. Farm Input/Output Daily Recordings:**

In order to determine the range of performance within the agriculturally oriented communities, it was decided to request householders to assist in recording the inputs and outputs of their own farming system. Thirty householders were independently and randomly selected from all the villages found in the five blocks. Before the selection was made, Village elders had been informed in a meeting of the purpose of this exercise and were requested to encourage cooperation from the recording households. Next a meeting

of all those selected for the exercise was convened and training was offered to enable them carry out the exercise satisfactorily. Every month, each householder was supplied with a big sheet with 30 or 31 square boxes drawn on it. Householders were then required to fill in those boxes on daily basis and indicate each day's activities based on inputs and outputs achieved.

#### **1.9. Daily Rainfall Records:**

All the thirty households recording farm inputs and outputs were equipped with diplex rain gauges purchased from United Kingdom. They used these to record the 1997 long and short rainfall. Householders received training in order to understand how to make readings on daily basis at a set time.

#### **1.10. Direct (Participant) Observation:**

In this method, observation of the households/community under study as well as their activities and events was under constant observation as I frequently criss-crossed the scheme monitoring whatever activities that were going on.

#### **1.11. Anecdotes:**

These were some short interesting stories and gossips collected from some key informants. These helped to understand some of the hidden social complexities and intrigues that would otherwise be not openly spoken about to a third party.

#### **1.12. Justification for the Research:**

This research is expected to:

- i. Shed light on the role livestock production plays in contributing to the food security and economy of agro-pastoralists in semi-arid areas of Kenya;
- ii. Increase our understanding of processes of social and economic change associated with shifts in settlement and landuse patterns in semi-arid lands, and;

Plate 1c. Assistant's Chief's Office 'under-a-tree' and Ilatu Township at the background, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Plate 1. Meeting with the Muuni local leadership group, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

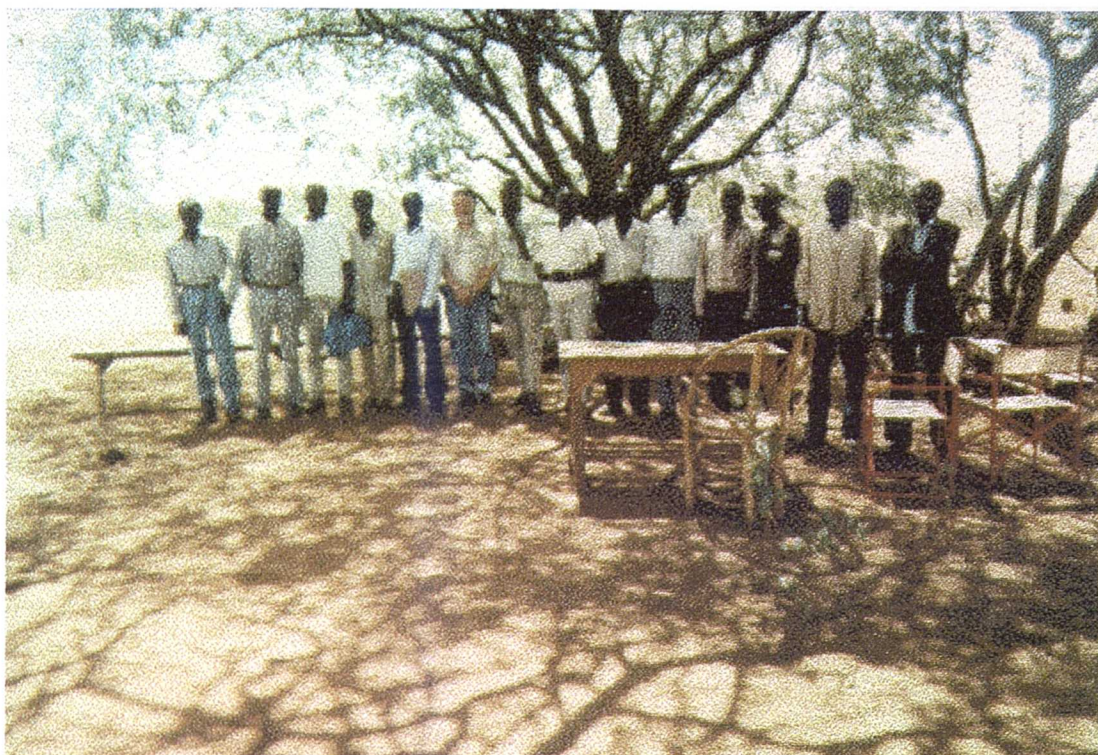


Plate 2. Field Data Collection Assistants, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

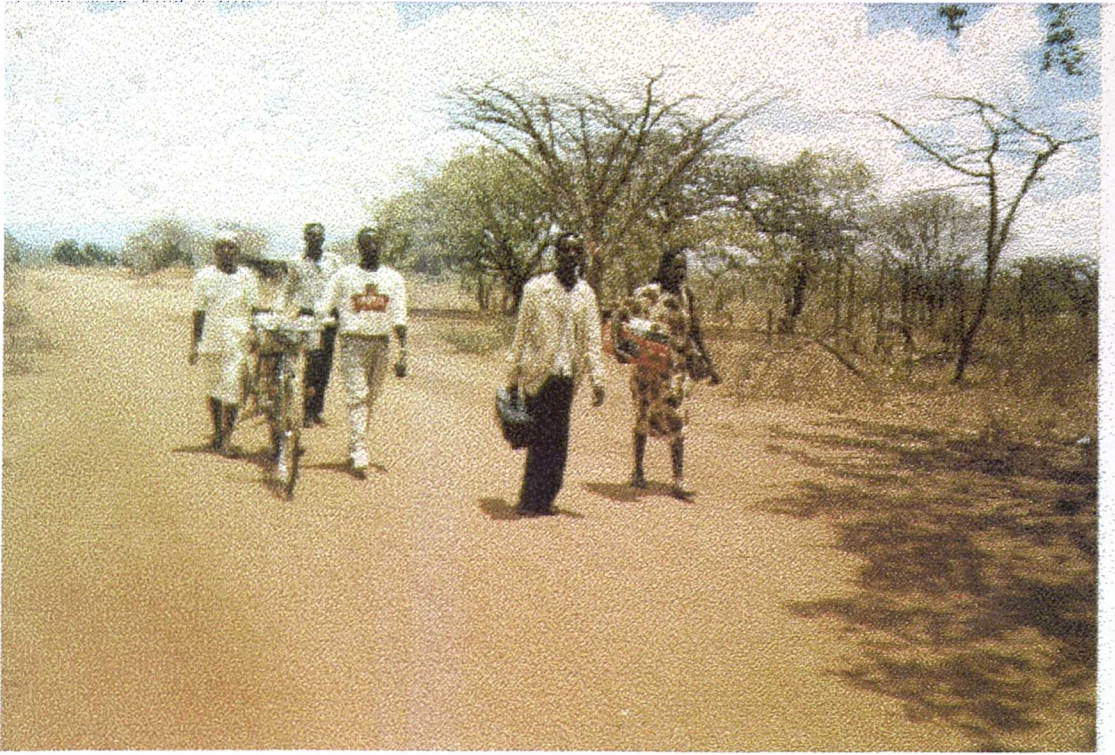


Plate 3. A Typical Women Focus Group participation, Muuni Settlement scheme, Makueni District, Kenya, 1997.

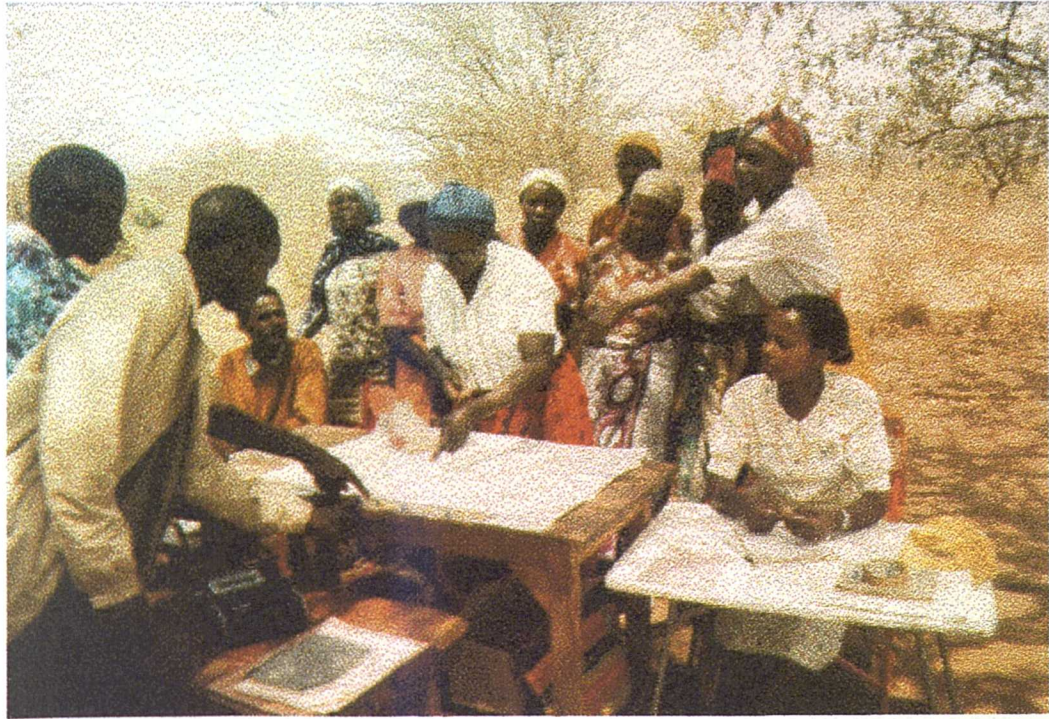




Plate 4. Typical Men Focus Group participation, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

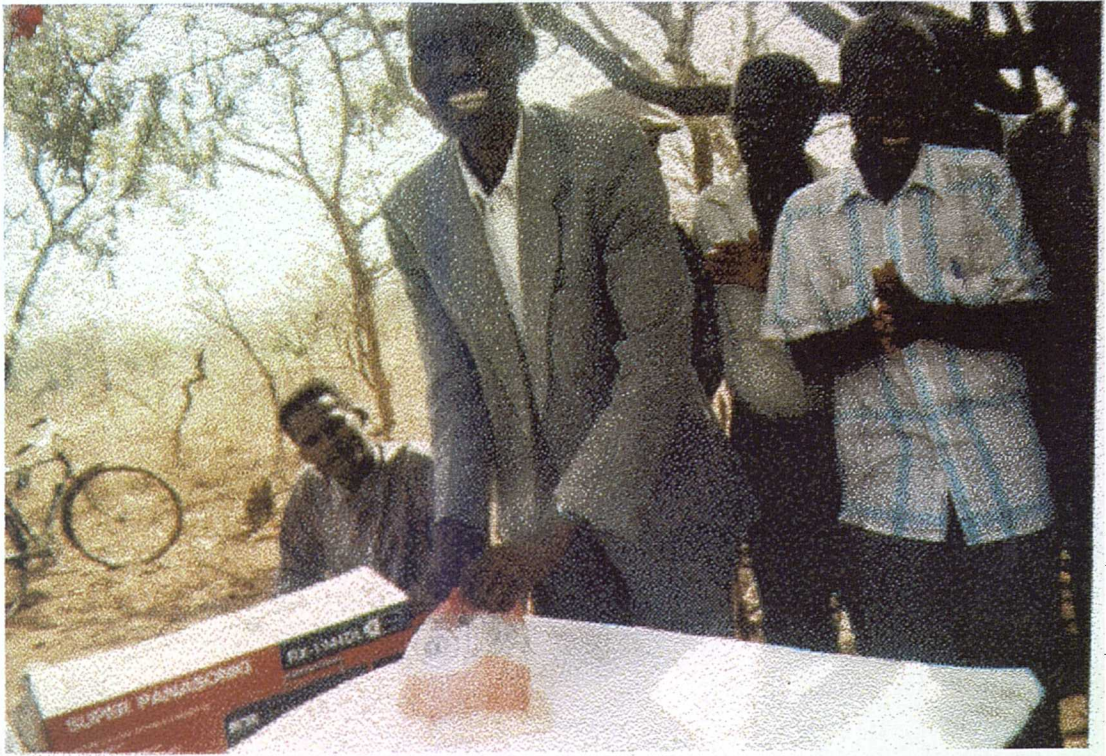
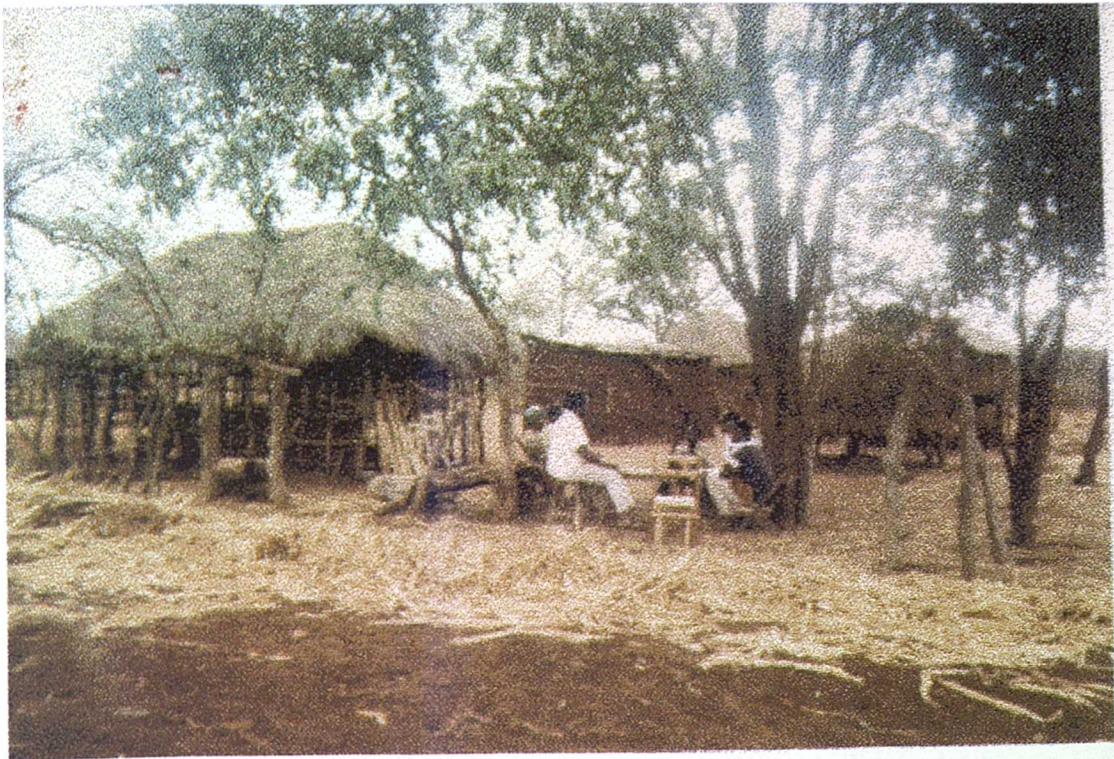


Plate 5. Typical Single Subject Interviewing at the home of the respondent, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



- iii. Assist national agricultural research programmes such as KARI to design effective agricultural technologies appropriate to the circumstances of agro-pastoralists in semi-arid areas.

The research is timely and relevant to the Kenyan situation in that KARI endeavours to develop technologies to address the constraints and sustainability of production levels for smallholders. In Kenya, there is now an increasing use of semi-arid lands for agricultural production resulting from the processes already described. Therefore, it is important that agricultural research in Kenya is capable of addressing new production problems which these emerging agro-pastoral systems, the structure and dynamics of which are as yet poorly understood, will undoubtedly encounter.

In a recent work, Gitunu (1994) identified the need to develop appropriate technologies that would address the problems of smallholder agriculture in semi-arid areas of Makueni District. An analysis of the applicability of Scudder's and other models of social change to the proposed research setting would go a long way in predicting how, when and why communities formed by unplanned involuntary settlement are likely to behave at various stages of adjustment to semi-arid dryland farming. This knowledge would help in planning research to develop appropriate technologies for such agro-pastoral communities in Kenya.

## **CHAPTER 2. GENERAL INTRODUCTION AND REVIEW**

### **2.1. Introduction:**

It should be understood that this study involves relocation of agro-pastoralists living in semi-arid areas of Kenya. It is therefore important to set the arena by giving an overview of the major components which form the basis for the study. This chapter starts with a description of Kenya rangelands as studied by various range scientists and ecologists. The overview also includes the major production systems which have sustained dwellers in these areas for many decades. Agropastoralism has received much attention due to the fact that traditionally, the community focused in this study practices this production system. Food security issues have also been considered in this chapter since they are a major component of the study. The types, causes and effects of human resettlement are also included as the community under review was relocated on several occasions in its history.

### **2.2. Rangelands:**

Kenya rangelands cover approximately 82% of the country's land area of 583,000 km<sup>2</sup>. Rangelands are broadly categorised into two main classifications---arid and semi-arid areas. These areas are the homes of about 25% of Kenya's people and nearly 50% of the country's livestock which include cattle, sheep, goats and camels (Karue 1989). Jacobs (1983) has classified these areas according to their different ecological potential and has shown the major characteristics describing each ecological zone as summarised in Table 2.

Table 2. Classification of Kenya's Rangelands by 'Agro-Climatic' or 'Moisture-Availability' Zones (from Jacobs 1983).

ZONE	CLASSIFICATION	ANNUAL RAINFALL (mm)	VEGETATION TYPE	MAIZE FAILURE RATE (%)
IV	Semi-humid to Semi-arid	600-1100	Dry Forest and Bushland	10-25
V	Semi-arid	450-900	Bushland	25-75
VI	Arid	300-550	Bushland and Scrubland	75-95
VII	Very Arid	150-350	Desert Scrub	75-100

Table 2 shows that semi-arid areas have a higher potential for agriculture and receive more rainfall than arid or very arid zones within what is classified as rangelands. Agricultural potential in this case is considered in view of the maize crop failure rate. The Maize crop failure increases with higher aridity. In Kenya, semi-arid areas are found mainly within eco-zones IV and V. Jacobs (1983) grouped the administrative districts found within rangeland areas as either containing pastoral or agro-pastoral production systems. He established that 73% of the districts found within semi-arid areas and 12% found within arid areas contained agro-pastoralism. He also established that semi-arid districts containing agro-pastoralism had on average a higher human density per square kilometre (34:10) than those containing predominantly pastoral communities. Further, the average percent of population increase (between 1969 and 1979) was shown to be in the ratio of 49:63 percent for semi-arid agro-pastoral and pastoral districts leading to an average rate of population growth of 3.8 and 4.9 percent for agro-pastoral and pastoral districts, respectively. This observation has been supported by Gatheru (1998). In her words, "land that was once the dry-season grazing ground of pastoral communities such as the Maasai, has been settled by agricultural communities, who in turn have been pushed out of their traditional homes by rapid population growth and an acute shortage of arable land. The population of Kajiado District rose from 22,000 to 86,000 in 1969, and 149,000 in 1979. This growth was primarily the result of Kikuyu and Kamba agriculturalists migrating into Maasai lands to escape overcrowding in the central highlands..."

### **2.3. Agro-Pastoralism:**

The following topic reviews what scientists have said about agropastoralism in studies carried out in different places. The review indicates that there is a complementarity associated with agro-pastoralism.

#### **2.3.1. General Overview:**

McCorkle (1992) broadly defines agro-pastoralism as any system of mixed crop and livestock production in which herd animals derive a portion of their diet, whether directly (by grazing) or indirectly (from cut-and-carry forages), from plant crops, crop residues or by-products, or fallowing fields. Jahnke (1982) supported the above by showing that in northern Nigeria (Table 3.), stubble grazing amounted to almost one fifth of the annual grazing time and it provided a considerable amount of dry matter and protein to livestock. Gitunu (1994) further supported it by showing that 48% of the Makueni agro-pastoral communities were feeding crop residues to their livestock.

In the traditional system, Muthiani (1973) and Sintio (1989) described Kenyan traditional agro-pastoralism as a nexus whose major economy was derived from livestock keeping and supplemented by some dryland farming especially where rainfall and topography were suitable for food crops. In the system, livestock would be grazed where land was unsuitable for farming. The production system was common in agro-ecological zones IV and V (Table 2). Muthiani further showed that in the agro-pastoral nexus, some members of the family, especially women, children and the aged, stayed in more or less permanent settlement areas which were suitable for food crop farming, (e.g., valley bottoms, highlands, river beds and forested areas) whereas strong men moved about in their agriculturally unsuitable communal grazing land with their livestock in search of water and pasture. However, in contemporary times, in his study of the agro-pastoral communities of the Makueni district of Kenya, Gitunu (1994) has shown that traditional agro-pastoralism is now taking a different direction. Gitunu's findings support the definition of McCorkle (1992) but differs from that of Muthiani (1973) and Sintio (1989).

Table 3. Average Straw Yield and Nitrogen Content of Crop Residues in Semi Arid Zones (from Jahnke 1982).

Crops	Straw (DM) t/ha	Nitrogen kg/ha
Grass fallow	3.0	24
Pearl millet	5.0	90
Sorghum	7.0	21
Maize	3.0	24
Groundnut	2.5	70
Cowpea	1.5	21

Whereas the latter two talk of an extensive communal grazing land in an agro-pastoral nexus, Gitunu (1994) identifies an agro-pastoral setting based on individual small-scale land holdings as shown in Table 4.

Table 4. An Average Typical Agro-Pastoral Household in Makueni district, Kenya (From Gitunu 1994).

NUMBER OF PERSONS			NUMBER OF LIVESTOCK				LAND AREA IN ACRES	
Adults		Children	Cattle Sheep Goat Chicken				Crop area	Livestock area
Male	Female	(Under 14 yr)						
5	5	8	11	6	17	30	10.4	24.4

It is important to note that in McCorkle's definition of agro-pastoralism, unlike Muthiani, Sintio and Gitunu, there is no reference to ecological zonation indicating where agropastoralism is most suitable. In an agro-pastoral production system, both livestock and crop production are mutually important components. Flint (1986) discussed mixed crop and livestock farming systems among 60 households in the Botswana Integrated Farming Pilot Project and has shown the types of inputs and management practices required for a functional agro-pastoralism. McCorkle (1992) has shown many advantages of combining agriculture and pastoralism both world wide and for systems in the Andes. The advantages include such interactions as: the cyclical allocation of fields to cropping and herding so that land is in constant production; the use of crop residues and by-

products to feed animals and, conversely, of animal manure to fertilise crops; the clearing, reseeded/trampling, and ploughing services livestock provide in field preparation; animals' transport of agricultural inputs and produce to and from fields and markets; the herd's critical role as an investment option for storing agricultural surpluses in a highly tangible form that when crops fail, provides ready cash for re-initiating cultivation. But he has also said that agro-pastoralism has its disadvantages too and particularly so in the household economies of peasant small-holders in that cropping and herding conflict with each other at many points such as ecological, technological, and socio-organizational. Many other authors agree with him in all or some these aspects (Allan, 1986; Holt, 1985; Guillet, 1987; Boesen, 1986; Massey, 1987; Sowers, 1987; Bencherifa, 1988; Little, 1984 and 1985; Kaufmann, 1986; Waters, 1984; Gryseels, 1986; Bauer, 1983; Houerou, 1989; Allan, 1986; McCorkle, 1983).

Probably the most recent authorities in agro-pastoralism include McCorkle (1992) who researched agro-pastoral systems in the SR-CRSP sociology project. The main themes of the study covered: the definition of agro-pastoralism; relationship between plants, animals and people; approaches to agro-pastoral systems research and; the human ecology of agro-pastoralism. In her second study based on the agro-pastoral dialectic and the organization of labour within the Quechua community of Peru, McCorkle (1992) studied the many advantages of combining agriculture and pastoralism. She showed how agro-pastoralism and labour organization strategies function in the community of Usi in Peru, the focal point of his study. The main themes of the study included: *Yanapanakuy* (or joint herding); *Tinkikuy* (or reciprocity in labour); species specialization; boarding; recruitment of child labour for herding; long term recruitment of child labour; wardship (guardianship); absentee caretaking and; *Dar en Partir* (or to give in sharing).

In his study of climate variability and complex ecosystems dynamics with implications for pastoral development, Ellis (1995) contends that one of the most pervasive powerful and unalterable sources of uncertainty impinging on African pastoral and agro-pastoral systems is climate variability. He continues to say that climate variability is characteristic of all drylands but particularly potent for Africa. Based on this contention he explores in details the: non-equilibrium theory and its application to dryland



eco-systems and African pastoralism; the empirical exploration of climate variability and complex eco-system dynamics; models of instability; domains of uncertainty in Africa and; challenges.

In his study of types of farming and land use systems adopted by farmers and ranchers of Machakos and Makueni Districts, Kenya, following subdivision of the co-operative farms and ranches Gitunu (1995) has shown how the commercially-oriented production systems in semi-arid areas transform into small-scale agro-pastoralism once the land is sub-divided. Gitunu finds that regardless of the ecological potential (especially in the semi-arid areas), smallholders appear always to lean more on crop than on livestock production in an agro-pastoral nexus.

Because there does not seem to be anyone who can truly claim to have the answer for what is going to sustain communities in the sub-divided rangelands (especially in the subdivided semi-arid areas), it is critical to investigate the social and economic implications on the relocated communities with the aim of designing relevant dryland farming research and develop attainable technologies in order to ensure sustainable household food security (Shirley 1995).

In his book, *Living with Uncertainty*, Scoones (1995) is probably among the latest writers on 'new directions in pastoral development in Africa'. His main themes discuss range ecology and some of its implications; unpredictable change as it reflects the alternatives to conventional planning and intervention; tracking a variable environment in supporting the opportunistic management strategies; institutional development for variable environments and; new roles for different actors such as programmes, projects and investments in the pastoral sector.

### **2.3.2. Livestock Production Component:**

Generally speaking, traditional livestock production has been the mainstay of pastoral and agro-pastoral food security and economy in rangelands. Aboud (1986) reported that pastoral societies use their livestock as their security in times of disaster. McCorkle (1992), Munro (1975), Gregory (1994), Bekure (1983), Jahnke (1982), Steinfeld (1988) have listed all livestock food and non-food products and services which

contribute to food security, labour and economy in general. These include fresh and dry meat, milk, cheese, blood, ghee, and fat for food; hard cash, wool, hides, leather, manure and transport. Mukhebi (1985) said that the widespread ownership of the livestock boma, oxen plough and livestock spray pump underlines the importance of livestock production in the system.

### **2.3.3. Crop Production Component:**

In his study of agro-pastoral systems of Southern Machakos district, Kenya, Mukhebi (1985) reported household ownership of dead capital items most frequently owned (by at least 50% of the households) are a jembe (hand hoe), panga (hatchet), oxen plough, grain store, axe. He said that the widespread ownership of the jembe, panga, oxen plough and grain store signified the importance of crops in the agro-pastoral nexus. He further studied in detail the significance of the following crop production items: types and seasonal importance of crops; reasons for mixed crop pattern; seasonal crop calendar; labour and power use for farming; crop and livestock interface and; major sources of food in household diets. Gitunu (1994) studied the importance of crop residues to livestock, the crop food reliability, food types and their sources and the proportion of income realised from crop production in this system.

### **2.3.4. Contemporary Context of Agro-Pastoralism:**

Agro-pastoralism has not remained the same all the time. In his study of southern Machakos district, Kenya, Mukhebi (1985) said the frequent ownership of the semi-permanent house and the bicycle gave some light on the living styles of the people and their orientation towards a cash economy. O'Leary (1984) in his study of the semi-arid areas of eastern Kenya has shown how the residents of Kitui district have moved from relative isolation and dependency on agro-pastoralism to a greater involvement in the national economy which provides a market for livestock, opportunities to earn off-farm income through wage employment, food in drought periods and consumer goods. Gitunu (1994) established that the total family income for an average household in

Makueni district of Kenya comprised the proportion earned from farm production (crops and livestock) and the proportion realised from off-farm sources of income (business, salary/wage earnings and remittance from kin and relatives). Norman (1968) said that it has long been a feature of anthropological monographs on rural peoples in Africa to include some account of the changes incurred by their involvement in wider social, economic and political structures, but frequently the anthropologist has attempted to deal with social change at the end of an analysis mainly devoted to the structure of equilibrium of the traditional tribal system. Some people have suggested that the reasons for this is that 'most tribal systems have in fact absorbed many changes into their traditional equilibrium. Norman continues to say that while he does not wish to dispute the validity of this statement, it seems that nowadays in many field work situations this predilection (fondness) for so called 'traditional tribal systems', with only minimal treatment of the emergence of new modes of behaviour and values, results in an unwanted weighting in favour of the 'fascinating complexities of tribal systems' and fails to take sufficient account of the development of new parameters for social action.

#### **2.4. Food Security:**

Food security has been either defined described or explained by many authors/scientists. Eicher (1986) defines food security as the ability of a country or region to assure, on a long term basis, that its food system provides the total population access to a timely, reliable and nutritionally adequate supply of food. Sarris (1985) defines food security as the satisfaction of national food consumption needs with certainty. Agarwal (1992) says that the issue of food security is considered in the sense of ensuring maintenance of food consumption levels in the context of specific contingencies rather than in the sense of providing adequate food intake for all. Clark (1991) mentions the 1983 FAO report which had given three specific aims of food security as ensuring production of adequate food supplies, maximum stability in the flow of food, and securing access to available supplies on the part of those who need them.

The importance of food security can not be overrated. Many reports have been written on food security based on: development agencies and studies (El-Ghonemy, 1993;

Hinds, 1991; Yaron, 1992; German Federal Republic, 1985; Ruttan, 1984; Beye, 1989; FAO, 1992; UK-Overseas Development Institute, 1987); gender contributory issues (Jacobson, 1993; Kennedy, 1992 and 1994; Bliss, 1992; Carney, 1993; Chiuri 1992; Massiah, 1993; Morgan, 1992; Okelo, 1992; Saito, 1994; Shiva, 1992; Swarnalatha, 1992); policy and social studies (Coughenour, 1993; Demery, 1993; Swaminathan, 1992; Harbeson, 1992; Nnoli, 1992; Rural Extension Bulletin-UK, 1994; Janvry, 1987; Harriss, 1988; McCabe, 1985; Mbogoh, 1983; Tullis, 1986; Falconer 1989); research, education and training (Chaguma, 1993; Hoffmann, 1993; Wymeersch, 1987; Woodhouse, 1989; Nwanze, 1988; Courade, 1987; Rukuni, 1987; Tewari, 1994; FAO, 1989; Sasson, 1990) and; food security problems and solutions (Tefe, 1987; Eicher, 1986 and 1987; FAO, 1994; Gakou, 1984; Guerraoui, 1986; Myers, 1984; Snowdon, 1985; Field, 1986; Boateng, 1987; Jutzi 1987).

The main themes of the above reports focus on the need to use and coordinate research, gender, education and training in development projects vis-a-vis all aspects of food production, distribution and accessibility. This is particularly true in the developing countries in order to develop dependable policies and long lasting solutions to food security problems.

## **2.5. Human Resettlement:**

The 1980s might well go down in history as the "decade of displacement. Whatever is the cause of the displacements, the close of the twentieth century will be remembered for the large numbers of people evicted from their houses, farms, and communities and forced to find a living elsewhere (Scott, 1993).

Kenya's post-independence era has been characterised by considerable migration of large numbers of rural dwellers to other rural areas in search of farmland. With the release of colonial restrictions on rural settlement following independence, there was much resettlement of high potential areas formerly owned by colonists of European origin. Recently, however, there has been a great deal of movement of people from these areas to semi-arid, more agriculturally marginal, lands due to population pressure and land hunger (Jacobs, 1983).

### **2.5.1. Causes of Resettlement:**

There are several causes of resettlement and relocation of people which can broadly be categorised under homelessness especially in western countries (Mann, 1973), wars and famines which have devastated Middle East and African countries, and development projects such as large dams and reservoirs whose impacts are strongly felt in countries such as Latin America and Asia (Scott, 1993).

In support of war/famine-related displacement several authors have investigated this area (Stein, 1986; Freud, 1988; Armstrong, 1986, 1987 and 1988; Debouvry, 1987; Aitchison, 1985; Uysal, 1987; Clark, 1987a; Christensen, 1985; Colchester, 1986; Spooner, 1984; Bulcha, 1985, 1987 and 1988; Chambers, 1982; Bascom, 1986; Gasarasi, 1984; Fre, 1984; Riemann, 1984; Attia, 1988; Allen, 1988; Clark, 1987b; Carrino, 1989; Frederick, 1989; Kibreab, 1985 and 1987; Hitchcock, 1987; Deihl, 1987; Rhodes, 1986; Kursany, 1985; Wallace, 1985; Wilson, 1985; Aguayo, 1987; Orr, 1985; Galvin, 1988; Hancock, 1985; Wood, 1985; Routledge, 1988; Jansson, 1987; Mackenzie 1987). All these generally express the stress associated with the plight of refugees given the fact that their relocation is due to circumstances beyond their control. Further, they contend that governments and other well-wishing agencies have a role to play in minimising the refugee plight. Some of the short term practical solutions to refugee plights are said to be provision of shelter, food and health care. Long term solutions are voluntary repatriation, local resettlement and third country resettlement. Furthermore, an immense exercise in ethnic engineering designed to combat tribalism and build national unity by dismantling ethnic differences is encouraged.

Development-caused displacement has been well studied and documented (Eidt, 1971; Sammani, 1985; Chole, 1984; Pendakur, 1984; Schrijvers, 1988; Voh, 1987; Ranger, 1989; Verzat, 1987; cowell, 1987; Sawant, 1985; Gillain, 1986; Apepell, 1987; Shoup, 1987; Jega, 1987; Hong, 1987; Cernea, 1988a and 1988b; Nayak, 1987; Teye, 1988; Koenig, 1986 and 1988; Achmad, 1988; Biswas, 1988a and Jahagirdar, 1990).

To summarise the historical well meaning of the foregoing kind of resettlements,

Eidt (1971) quoted the *Art. 1, National Colonization Law No. 12,636, 1940*.

“The nation will apply, in keeping with present standards, an agricultural plan designed to populate the interior of the country, to rationalise rural developments, to subdivide land, establish rural population on the principle of land ownership, and to provide greater well being for agricultural workers”.

However, there is a general agreement in that the contemporary development-oriented resettlements are characterised by involuntary or voluntary relocation associated with top-down decision making process. Whereas this has been shown to have some advantages, there are also disadvantages attached to it too. Suggestions made above tally quite well with steps taken when planned relocation is envisioned. This is determined by the amount of money, time and effort invested in the pre-relocation planning stage (Mc Millan, 1995 and De Wet 1993). According to Mc Millan (1995) some people had to leave the Upper Volta Valley settlement scheme, an area which had been cleared of river blindness-causing flies, even though they apparently had made a considerable success there. They wanted greener pastures elsewhere. Likewise, De Wet (1995) showed that while some Xhosa people benefited from the villigisation program others resented it bitterly. Those who benefited got prime land portions like valley bottoms where they were able to exploit the horticultural industry and thus improve their households' lot. Those who resented the program, got poorer land portions and felt confined within their boundaries without much, choice like prisoners. They hopelessly yearned for their pre-relocation lifestyle, characterized by free spatial exploitation of the common land resources. A down-top decision making process is encouraged with the view to minimise the resettlement stress.

### **2.5.2. Types of Resettlement:**

There are four main types of resettlement as depicted in Table 5. Some considerably important recent studies done on resettlement types indicated by A, B and C (Table 5) are based on the work done by (McMillan 1995, De Wet 1993 and Gitunu 1994).

McMillan (1995) studied the voluntary and planned resettlement (Type A) in the Burkina Faso Volta Valley Development Authority or *Autorite' des Amenagements des Vallees des Volta* (AVV) scheme which was intended to resettle people from Central Mossi plateau in previously unsettled areas that were now freed of river blindness. His main study themes are based on: the original visions of the donor community e.g., World Health Organization (WHO) to launch a massive \$56.2 million programme as phase one of an effort to control *Onchocerciasis* (the fly responsible for/and or carrying the causative agent for eye blindness) in a seven country (Burkina Faso, Mali, Niger, Benin, Togo, Ghana and Cote D'Ivoire) area of West Africa. The decision to focus on river blindness was based largely upon donors' visions of the control programme's potential positive economic impact on the area; the social context of immigration to the AVV, 1978-1979; the AVV project vision; the initial settler adjustment and settling in, 1974-1979 and; the early economic changes and assessment, 1979-1980.

Table 5. Types of Resettlements as studied by De Wet (1993), Gitunu (1994 and 1999) and McMillan (1995).

<b>Planned:</b>	<b>Voluntary</b>	<b>Involuntary</b>
	<b>A</b>	<b>B</b>
	-People have seen the need and are willing to shift to new farming methods and/or social relations.  -Support services are planned for and provided to settlers.	-People are unwilling to shift but are forced to do so.  -Support services are planned for and provided to settlers.
<b>Unplanned:</b>	<b>C</b>	<b>D</b>
	-People have seen the need and are willing to shift to new farming methods and/or social relations.  -Planned support services are <b>not</b> provided.	-People are unwilling to shift but are forced to do so.  -Planned support services are <b>not</b> provided.



De Wet (1993) studied a planned involuntary resettlement (Type B) in a villageisation programme among the Xhosa in South Africa. His main study themes cover: the social stress of relocation))which he contends are always there whether the relocation is voluntary or compulsory, citing Scudder and Colson (i.e., Scudder 1985; Scudder and Colson 1982); the stress due to change in climate, economic adjustments, administrative structure, social groupings and ecological patterns and; the problems of top-down planning which render people powerless in decision making. In his Masters thesis study, Gitunu (1994) investigated a spontaneously (voluntary but unplanned) relocated people (Type C) that had shifted from the northern high potential agricultural areas of Makueni district, Kenya to southern lower potential areas of the district. However, unlike McMillan (1995) and De Wet (1993), Gitunu (1994) did not directly apply the Scudder model to analyse the social consequences of relocation. Gitunu (1994) however, studied the community's history, economy, occupation and culture. He further described the production strategies contributing to social and economic survival of households in the newly resettled area. Generally, Gitunu proved that there was a socio-economic stress associated with relocation even though, such relocation is a voluntary one. He did this by comparing farming lifestyles and management practices adopted by the Kasikeu (high potential area) and Mtito-Andei (low potential area) people. Although Mtito-Andei settlers had voluntarily shifted from Kasikeu area due to land pressure, they were nevertheless, undergoing a stressful socio-economic adjustment process. Gitunu (1994) proved this fact by showing the following: First, they kept smaller cattle herds than their counterparts in Kasikeu though the size of their flocks was superior. Secondly, they received lower market prices for their livestock than those in Kasikeu. Thirdly, in order of their priority, three sources were their very means of survival namely, crop farming, livestock keeping, remittance from close family members and small-scale business. They also had to depend much more on wage earning for their households' survival than those in Kasikeu. Surely these and many more other factors in Gitunu's study showed that people in Mtito-Andei were undergoing a stressful socio-economic adjustment process even though they did not resent it given the fact that their relocation

was purely voluntary. Cernea (1993) has considerably covered the anthropological approaches in to involuntary resettlement in the areas of policy, practice and theory. His main thrust is the resettlement caused by development projects. As an anthropologist he strongly contends that he believes that resettlement will succeed only when the traditional tools of development planning are complemented by ethnographic research and the active involvement of the people affected by resettlement in project decision making. He examines the World Bank resettlement policies and has cited a case study of Costa Rica's Arenal project which has illustrated the difference that policy frameworks can make if they are conscientiously applied. He says that Arenal forms one of those rare species where successful resettlement has withstood the test of time. Under the subtitle 'practice', he has said that resettlement have remained dominated by rigid physical planning considerations rather than more flexible approaches that would harness local knowledge and give the affected people direct power to over decision-making. Under the subtitle 'theory', it is brought to light that resettlement theories that focus primarily on the process of displacement and re-establishment exclude critical interactions between resettlers and the larger socio-political environment. Additionally, Cernea (1993) has also studied the anthropological and sociological research for policy development on population resettlement. He contends that explicit social policies must guide, inspire and restrict public sector programmes that aim to induce development by using financial triggers. He further says that social science knowledge must be applied not only to evaluate policy but also to formulate policies.

Both Sugden (1995) and Evans (1995) have done studies related to agro-pastoralism in and around the area proposed for my study. Whereas the former studied the issues involved in the settlement of landless people in the semi-arid tropics with particular reference to Makueni district of Eastern Kenya, the latter studied and proposed a farming system for agro-ecological zone four (IV) and five (V) with special reference to Muuni settlement scheme near the Kiboko National Range Research Station, Makueni District, Kenya.

### **2.5.3. Effects of Resettlement:**

Whatever the reason, human relocation causes considerable stress to both the production and the social system as the affected people undergo the adjustment process within their new environment. Such stresses will in turn contribute in shaping the land use and social organisation patterns evolving as a result of the shift. In addition, changes in these patterns may have implications (either positive or negative) for the food security situation for households and other social units. This is particularly true for households and communities in the semi-arid areas where dryland production of food crops is marginal.

Cernea (1993) says that even where good resettlement policies are applicable, such policies do not necessarily clear resentment of involuntary resettlement. He has however cautioned that although anxiety and insecurity are associated with any type of large scale movement, they are present at higher rates among involuntary resettlers than with people who voluntarily move in search of new opportunities.

### **2.5.4. Statement of Resettlement History in Kenya:**

History of resettlement in Kenya dates back in the British colonial era during which time squatter settlements are shown in the study (Mbithi 1975) to be a result of spontaneous movement of potential farmers and unemployed persons to occupy land for which they have no legal title for the purposes of establishing residence and /or cultivation.

Squatting became a critical problem after 1912-1925 labour laws which encouraged Africans already displaced or experiencing population pressure due to European settlement, to settle on European land as labour tenants.

Mbithi (1975) classified squatters into 5 categories:

1. Traditional squatters who continue to live, cultivate and keep livestock on large scale farms which are either individually owned or recently purchased by the state or co-operatives or Ministry of Lands and Settlement. This form of squatting was initiated by European settlement and labour policies as early as 1910.

2. Settlers who migrate due to famine, drought, land pressure in home areas or those who migrate as a political manoeuvre to gain possession of unoccupied special reserves, state land, margins of game parks or land owned by a pastoral tribe or large scale farmers.
3. The special type of squatters found within the 10 mile Coastal strip who are “contract” squatters according to Muslim land tenure or who are recent migrants due to famine or drought within the drier hinterland.
4. Squatters within settlement schemes who are by law illegal residents in these schemes. This category includes settlers on co-operative farms who fail to pay their dues and refuse to move out or mature children (second generation) within the settlement schemes who by law should leave the scheme on reaching maturity but do not.
5. Tenants within the context of customary land use practices where a land owner may allow a friend or landless relative to squat on a portion of his land so long as the friendship lasts.

Kenya’s post-independence era has been characterised by considerable migration of large numbers of rural dwellers to other rural areas in search of farmland. With the release of colonial restrictions on rural settlement following independence, there was much resettlement of high potential areas formerly owned by colonists of European origin. Recently, however, there has been a great deal of movement of people from these areas to semi-arid, more agriculturally marginal, lands due to population pressure and land hunger.

Whatever the reason, human relocation causes considerable stress to both the production and the social system as the affected people undergo the adjustment process within their new environment. Such stresses will in turn help shape the landuse and social organisation patterns evolving as a result of the shift. In addition, changes in these patterns may have implications (either positive or negative) for the food security situation for households and other social units. This is particularly true for households and communities in the semi-arid areas where dryland production of food crops is marginal.

Traditionally, livestock production has been the mainstay of pastoral and agro-pastoral food security and economy in the semi-arid areas of Kenya. Whether this continues to be the case will depend on the outcomes of social and cultural changes that accompany the evolution of production methods and landuse systems in these areas. For example, more and more pastoralists are becoming agro-pastoralists due to changes in their land tenure systems. This leads to an entirely different production system based on restricted livestock movement and, in some cases, dryland farming of crops. There may be similar changes in their social and cultural behaviour as they undergo this process of adjusting to agro-pastoralism. Likewise, population pressure and forced resettlement can cause movement of sedentary farmers from wetter, more arable areas, to drier, more agriculturally risky, areas. One might expect that, along with changes in location, these people would experience significant changes in their farming practices, their social organisation and cultural outlooks as they continue to adjust to a dry farming ecology hitherto unfamiliar to them.

#### **2.5.5. Settlement History of Kibwezi-Mtito-Chyulu Hills Zone:**

Until early in the 1920s the Kambas were settled around and on the Ngulia Hills (present day area surrounding Ngulia Lodge in Tsavo National Park). About 1927, the colonial government called for eviction of the people from these areas because the government planned to create a royal park after declaring these plains Crown Lands. Migration that followed carried the Kamba people to Ngwata and the Chyulu Hills areas. Within ten years the government decided that these new areas were better left for game and so the Kambas were ordered to move out. But not all moved out. A small portion of the population decided to remain in Ngwata, nevertheless. They became self-styled hunters whom the colonial government labelled as poachers. Because of the good climate and vegetation on the Chyulu Hills, some Kambas would not agree to vacate the Hills, even at gun point. On the whole the determined Kambas were very small in number. The majority founded new homes along the Kyale river near Kiboko in Kikumbyu Location, north of Kibwezi. Others settled around Kikuyuni, Kalulini and Kilungu and up to River Athi along the present day Kimbwezi-Kitui road. Other resident of Chyulu Hills who felt

threatened found their way to Loitokitok, while Kambas from around Nooka Hill went as far as the Arusha-Moshi area in Tanzania, Taita, Mariakani, Mwaleri, Ngorongoroni and in Mbololo. A small number settled as squatters I DWA sisal plantation near Kibwezi. Others settled in Kalulini and Mbui Nzau in Kikumbulyu.

In 1961 people started to flow back in Ngwata area, first by a trickle. The Chyulu Hills were conspicuous attraction for most arrivals. Many returned from Tanzania, Loitokitok, Taveta, Mariakani and were joined by land seekers from other locations such as Kalama, Okia, Mbitini, Mukaa, Kangundo and Nzau. The volume of migration began to build up very quickly and those who had fled into Kikumblyu area beyond Kibwezi, and those squatters on DWA farm and the Kathekani factory area began returning to their former holdings in Ngwata area. In 1964, the area was very heavily settled. The migrants included non-Kamba people namely Kikuyu, Luhyas, Taitas and Luos, who left Tanzania after that country attained its independence in 1961.

In 1962 the government ordered all those dissidents in the Chyulu Hills to come down and settle on the lowlands. People proved stubborn but the government was quick to act. Soon after Independence (Uhuru) in 1963, the General Service Unit (GSU) went into action on the Chyulu Hills. Houses were burned down, people arrested and their animals detained. The majority of the people decided to leave the Hills permanently but local politicians became involved with the issue. Early in 1964, people were on their way back to Chyulu again. Meanwhile, delegations were sent to the members of parliament of the area at the time, but no concrete decisions on the matter were made.

In 1964, sometime in October-November, the GSU under the orders of the District Commissioner, Machakos, went into the Chyulu Hills and brought down with them those found living there. These people were detained around Thange. Early in 1965, the government seemed to realise the seriousness of the matter and it granted the Masaku County Council the land stretching between DWA farm and Mtito Andei and hemmed in between the railway line to the East and the old Nairobi-Mombasa road to the West. This area was to cater for the detainees at Thange and many more settlers from other locations in Machakos District, provided they produced a letter from their home chief. Each new settler was given 50 acres on which to settle but the allocation of the land was terminated

at the banks of the river Nzui. So the area beyond river Nzui up to Mtito Andei was randomly settled and consequently there are more people living in this section but on much smaller plots than their neighbours, across Nzui River on the way towards Kibwezi.

1970 was the birth of a new era. The District Commissioner, Machakos, gave an ultimatum to those people living on Chyulu Hills: he gave them 21 days notice to vacate the hillside or risk eviction. The local people sent delegation to the Kamba members of Parliament and pleaded with them to ask the DC to withdraw his 21 days notice. The MPs' counsel to the delegate was to continue settling on the Hills. In May, the Provincial Commissioner (PC) Eastern Province and PC Coast Province and all Kamba members of parliament met at Kambu market (the most fast growing market in Ngwata location). At that meeting, it was resolved that the Chyulu Hills dwellers should come down and settle anywhere they pleased off the Nairobi-Mombasa main road but they should leave an unsettled zone of one mile from the Chyulu Hills. This led to a big influx of people into Mangelete area which had been nicknamed "Kenyatta area" because every other month smoke from burning homes confirmed that the GSU were in action in that area. (It was supposed to be out of bound since it was shooting block known as "73 shooting block").

The Tsavo National Park personnel became involved in 1971. They fixed a fire break boundary running along the foot of the range six miles off the Chyulu foothills. They deemed that the settlers within the new frontier-between the fireline and the foothills-were trespassers and ordered them to resettle behind the fireline. This was unthinkable in the minds of many and was in itself a contradiction to the two PCs' resolution. But the PC Eastern province urged these people to move out of the fireline-foothill area and consequently withdrew his one mile limit line.

The Deputy Provincial Commissioner (PC) Eastern Province toured the area in February, 1972, and said that the District Commissioner (DC) Machakos would come to do a detailed study of the area and should come up with the best solution to the problem. He suggested that if need be a barbed wire fence should be put up to separate the wildlife from the civilised one. 14<sup>th</sup> of April saw the visit to the area by the DC Machakos, District Officer Makindu, Chief of Ngwata Location and the lone sub-chief of the Location. In their tour of the Chyulu Hills, they found that during the absence of government

appointed administrator the people up their had set up their own administration (sub-chief). After the tour, the DC promised he would write a comprehensive report which would promote a better understanding between government and the people of Ngwata Location and a greater sense of duty towards the country by the people. Ensuing is the summary and implications:

1. Between 1925 and 1936 the colonial government declared areas settled by the Kamba and traditionally recognised as part of Kamba land as Crown Land.
2. Although most of the people migrated due to the demand by government, some “hard-cores” remained, especially in the Chyulu Hills.
3. Near the time of Kenya’s independence, people began returning to the area to settle.
4. In 1964, the area between the railway and the tarmac road between Kibwezi and Mtito-Andei was declared County Council land and designated for settlement. Candidates for land were only required to produce a letter from their Chief. Surveying and settlement in fact took place only between Kibwezi and the River Nzui.
5. No other section in Ngwata has been formally settled although the squatters have established their own administrative system for settling newcomers.
6. Continuous and conflicting re-interpretation by various levels sections of the government concerning the area where squatters can be settled has increased the squatters’ insecurity.

The past history of the area shows that it is extremely difficult to prohibit settling in the Chyulu Hills. This is mainly because of the good vegetation, drainage and adequate rainfall. It is essential, though, that an attractive alternative place for settlement be offered to the people on the Hills, for the Hills serve as a mutual boundary for the Game Park, a forest reserve and more significantly they provide the source of water for the entire Ngwata area and for areas as far as the coast, including Mombasa. The springs at Mzima and Omani as well as other places are outlet for moisture absorbed in the Hills. The



persons between the fireline and the foothills must be convinced of earning an equivalent living on the site to which they are moved.

## **2.6. An overview of Geographical Area and Study Sites:**

The area around Kiboko NRRC which forms the study area has been classified as Lower Midland 5 agro-ecological zone suitable for millet cultivation and livestock keeping (Jaetzold and Schmidt 1983). The zone receives a bimodal (mid-March to mid-April; end-October to early-January) rainfall averaging about 600-750 mm. per annum. The first rains have poor yield potential only for millets, while the second rains have fair-good potential for millets and sorghums and poor-fair potential for maize. Soils are dark red to strong brown sandy clays on undifferentiated Basement System rocks with low fertility. Millet yields range from 600-1000 kg. per hectare. Conditions around Kiboko station are even drier with Kiboko Tsetse Control Station reporting a 20-year average annual rainfall of 595 mm.

The agro-ecological situation around Kiboko can be contrasted with the conditions the community to be studied left in the Chyulu Hills in the south-east part of the district. These areas are classified as mainly Upper Midland 4 (Sunflower-Maize) or 3 (Marginal Coffee) zones, with small areas of Lower Highland zones suitable for wheat-maize or cattle-sheep-barley production. The UM 4 zone receives 700-800 mm of annual rainfall and has good yield potential for maize during the second rains and sunflower for both rainy periods. Soils are moderately deep to deep black, very friable reddish brown sandy clay loams of recent volcanic origin with moderate fertility. Average maize yields vary from 850 to 2400 kg per hectare.

As the name implies, agro-pastoralists in Makueni District engage in both crop and livestock production. In the past, livestock played a central role in their subsistence, economic, social and cultural systems. The Kenyan post-independence era has been marked with increasing human migration and resettlement of the drier areas of the district. These are the areas which used to serve the pastoral component of the agro-pastoral systems in use there. Recently, Gitunu (1994, 1995) has characterised

Plate 1a. Chyulu Hills Seen at the background, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

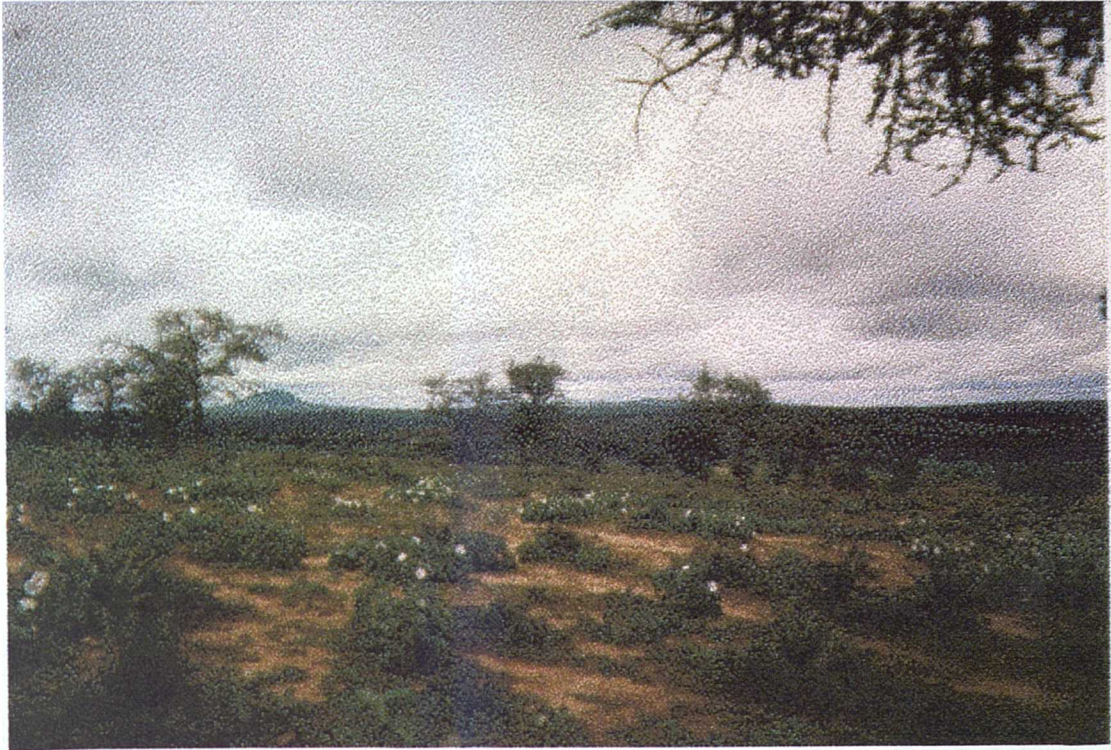


Plate 1b. Kalembwani area seen at the background, Makueni District, Kenya, 1997.



household-based, agro-pastoral production systems for two areas in the district, Kasikeu and Mtito Andei. Households are large, averaging 5 adult males, 5 adult females and 8 children. Average land holdings are 10.4 acres for crops and 24.4 acres for grazing. The average herd consists of 11 cattle, 6 sheep and 17 goats. From his survey of the district he concluded that the traditional model agro-pastoralism of sedentary agriculture and mobile livestock production is no longer the case. Whereas in the past, these areas were communally owned and exploited by Akamba agro-pastoralists, they have now been demarcated and allocated to individual households. These households continue to do some cropping and livestock keeping. Herd and flock sizes and composition are variable and depend on many factors such as household size and preferences, proximity to markets and off-farm sources of income. Gitunu further concluded that agro-pastoral systems in the district are maintained by not only their crop and livestock production but also to a significant extent by off-farm sources of income which include business, wage/salary earnings and remittances from absent kin.

The community studied been chosen primarily from villages and households that form part of the Muuni Settlement Scheme. This scheme has recently been studied, the findings of which are reported in the MSc. theses by Sugden (1995) and Evans (1995). The area where the scheme is located was formerly part of the Kenya Agricultural Research Institute's (KARI) National Rangelands Research Centre at Kiboko. Contrary to what Sugden reports (Sugden 1995) the majority of settlers are predominantly Akamba. Most of them were sedentary farmers who were relocated from a relatively wetter arable farming area in the Chyulu Hills. Sugden states that these people, came from a stable-community with a plentiful water supply from higher rainfall and good run-off, (Sugden, 1995). Evans (1995) has observed that settlers from the Chyulu Hills cultivate crops and keep livestock that are said to be unsuitable and inappropriate for conditions around Kiboko. The community is in the process of adapting its former patterns of farming to the more agro-pastoral production system required for the conditions around Kiboko. Many of settler households attempt this adaptation on the 4 ha plots allocated them by the government. This is considerably less than the average holdings reported by Gitunu (1994) for nearby communities. Sugden reports that

between 1400 and 1500 families currently occupy the scheme and lists 9 established villages. Infrastructure consists of primary schools and one borehole located in Katangani village. According to Sugden, the settlers have received no financial backing or planning assistance from government and most are on food aid provided by the World Food Programme (Sugden 1995).

## **2.7. Thesis Structure:**

The thesis structure is composed of eight chapters. The first chapter reviews conceptual, theoretical and methodological framework. Chapter two reviews major components that form the basis of the study. Chapter three gives a historical and current background analysis on settlement and livestock production systems based mainly on group discussion and single subject analysis and results. Chapter four describes the analysis and results of the impact of relocation on social systems. Chapter five gives results of food security systems and strategies adopted by people to ensure food availability all the time and especially so during critical periods such as droughts. Chapter six gives results of the factors influencing farm production. It puts into account farm input and output production data analysis in relation to rainfall recorded by individual householders selected from the study area. Chapter seven describes results of 30 selected case studies. This information is used to triangulate information given by focus groups and single subject interviewees as well as information from farm production data. Further it is used to understand how the Muuni community adjusts in restoring the disrupted social and production systems and chapter eight, the last one discusses the study major conclusions and gives recommendations for the future relocation strategies.

## **2.8. Accomplishments of the Study:**

This study has investigated the changing nature of and the factors affecting livestock and crop production, social organisation, cultural values and household food security for an agro-pastoral community formed as a result of unplanned resettlement in the semi-arid zone of Makueni District, Kenya. The study use mainly qualitative methods such as semi-structured interviews and PRA techniques to collect field data in order to

address research questions developed from models of social change taken from previous studies of involuntary resettlement. My study has increased our understanding of the role livestock and crop production plays in contributing to food security and to the processes of social and economic change associated with shifts in production system to agro-pastoralism in semi-arid areas. The results of this study are expected to assist national agricultural research programmes such as KARI design appropriate agricultural technologies for agro-pastoralists in semi-arid areas.

**CHAPTER 3.**  
**HISTORICAL AND CURRENT BACKGROUND ANALYSIS**  
**OF SETTLEMENT AND LIVESTOCK PRODUCTION SYSTEMS**

**3.1. Introduction:**

In view of the fact that the primary objective of this thesis is to improve our understanding of the role livestock production plays in socio-economics processes of change in semi arid areas of Kenya, it was necessary to analyse and understand the peoples' historical and current background of settlement and livestock production systems and how these systems were affected by the relocation. This chapter mainly focuses on the value of livestock and the impact of the relocation upon them. The contents of the chapter are based on the information perceived and given by various focus group discussants, single subject interviewees and key informants.

Traditionally, Kamba people as a community are known to subsist on both crop farming and livestock production. These are the systems which have sustained their livelihood over years and that were badly hit by the relocation of the study communities that form the basis for this study. For the purpose of this chapter, much emphasis is given to livestock production practices and their importance in contributing to household food security, monetary requirement and socio-cultural obligations.

Figure 3f. shows that there were two main areas namely Chyulu Hills and Kalembwani area from where the bulk of Muuni community was relocated. A minor group came from Kibwezi area. In addition to those who were officially settled in Muuni, there were also a number of land buyers as shown in Table 6, who infiltrated the process. In this Chapter results from Focus Group Interviews are discussed and supported by expressions made

Table 6. Muuni Settlement Status, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

AREA ORIGIN	N0. OF HOUSEHOLDS	OF UNSETTLED HOUSEHOLDS	COMMENTS
<b>Chyulu</b>	427	10	9 Households own land elsewhere 1 Household sold out
<b>Kalembwani</b>	340	16	14 Households own land elsewhere 2 Households sold out
<b>Kibwezi</b>	24	4	2 Households own land elsewhere 1 Household sold out 1 Household's case unknown
<b>Land buyers</b>	191	4	All 4 Households own land elsewhere
<b>TOTALS</b>	983	34	*29 Households own land elsewhere *4 Households sold out *1 Household's case unknown



by single subject interviewees. Respondents in Focus Group Discussions (FGD) and those in Single Subject Interviews (SSI) were drawn from the three areas of origin, namely Chyulu Hills, Kalembwani and Kimbwezi areas. Another source of information for this chapter is the data on livestock obtained from the farmers daily records as shown in Tables 8 and 9. Information given by all these respondents helps in understanding Muuni Settlement Scheme and the impact of the relocation on livestock mainly.

### **3.2. Origin and Status of People Pre-relocation:**

One of the study objectives is to document changes in individual and group values and attitudes toward livestock husbandry as part of the adjustment process. As shown in Table 6, results obtained during this study indicate that the people of Muuni had originated from three areas namely Chyulu Hills, Kalembwani and Kibwezi areas. Other settlers were those who had settled after buying land from the entitled land allottees. As shown in Table 8, household and indeed community livestock numbers, structure and composition were adversely affected by the relocation. The impact and degree of livestock changes and values depends on where people originated from and the forage/water resource base at their exposure. Muuni community puts more of their production efforts to crop production than to livestock due to the fact that their forage/water base at Muuni was critical year round. The ensuing subheadings will describe discussions on peoples' pre- and post-relocation status as perceived by the study respondents.

#### **3.2.1. Origin and General Status of People Before Settling in Chyulu Hills:**

There were two men and women focus group discussions on livestock. Both groups had originated from Chyulu and agreed that livestock were adversely affected by the shift from Chyulu to Muuni.

As to where Chyulu people came from before they settled on the Chyulu Hills, both men and women groups were in agreement that majority had originated from upper areas of Makueni District (Figures 1 and 2). These areas included Mukaa, Kilungu,

Mbooni, Mbitini, Kalama, Sultani Hammud, Wamunyu and Nzai. The men group mentioned another group of people that had come from Kitui District. Men said that this group was the first to settle in Chyulu before 1960 and that they first came as hunters and honey harvesters and they acquired livestock later. The name of these people was given as *Ngulia*. However, the group did not want to be called by this name since the name had a derogatory connotation in that it is associated with people who will eat almost any wild animal including monkeys. The men noted the 1960s as the period of time during which majority of the people settled in the Chyulu Hills.

According to both men and women FGD, some people traveled with their livestock which were composed of indigenous species of cattle, sheep and goats to Chyulu Hills from their places of origin. Every respondent reported that the main reason for moving from their ancestors' land was to search for land due to kin pressure exerted upon ancestry land. They said that the younger and vigorous generation found it necessary to exploit any possible opportunity to acquire land elsewhere. Livestock as a means of household food security and other obligations were highly valued by the Chyulu hills community due to the fact that production conditions were favourable.

### **3.2.2. Origin and General Status of People Before Settling in Kalembwani Area:**

Here again, there were two FGD one for women and the other for men. According to the women's FGD, the people settled in Kalembwani were European farms' ex-workers who became squatters after the Europeans left following the country's independence. Most of these ex-European lands were sold to co-operatives. Some of the former workers were shareholders in those co-operatives as long as they could afford to raise money and contribute to the share capital.

Nevertheless, not all were able to raise this capital and therefore they became squatters because they claimed they had nowhere else to go. In time these squatters were evicted. They went to an area called Kalembwani and started making friendship with Maasai people who as a community owned vast land for grazing across to the West of the Nairobi-Mombasa railway line. Maasai are known to be poor land tillers but very good

livestock keepers whereas Kamba people are known to be somewhere in the middle, hence the name agropastoralism fits them very well. So on the one hand Maasai needed grain and pulses to supplement their notoriously and excessively animal protein rich diet composed of milk, animal fat, ghee, meat and sometimes blood and on the other hand, the Kamba people needed pasture for their livestock and if possible some land for tillage to satisfy their agro-pastoral nexus. Thus, mutually beneficial arrangements were sought and achieved.

According to the men's FGD, as early as 1930s, people came from Mukaa and Kilungu areas and made friends with the Maasai. In some cases intermarriages were possible but lop-sided in that bridegrooms were Maasai and brides were Kamba. This led to more and more mutual relations between the two ethnic groups and more and more Kamba gaining access into Maasai lands. As the time passed Kamba people developed firm roots in Maasai country and started laying claims using natural features, such as rivers, as their boundary markers.

The men's FGD indicated that some people migrated to Kalembwani with their livestock whereas others acquired them later. The women's FGD indicated that White Settlers had allowed Kamba people who worked on their farms to keep a few livestock. So these are the livestock with which they migrated to Kalembwani. Livestock as means of household food security and other obligations were highly valued by the entire Kalembwani area community due to the fact that forage and water resources were not a limiting both in dry and wet seasons.

### **3.2.3. Origin and General Status of People Before Settling in Kibwezi Area:**

The women and men originating from Kibwezi were subjected to single subject interviews (SSI) because their number and distribution on the scheme was inadequate to form focus group discussions. Three women and three men were interviewed.

One of the women said that in Kibwezi they were all living in a village situated near the District Officer's (D.O.) residence. She went on to say that before they settled in this village they were all living in different places in the town of Kibwezi. She said that the

reason why they were rounded up and put in this village was because they had started keeping livestock in the town. The livestock were roaming everywhere in the town and had become a nuisance to motorists and town dwellers. The village was known as *Mikuyuni-Kivuthi* (In Kamba language Mikuyuni means area of fig trees and Kivuthi means a ground covered by volcanic lava flow). So essentially this means that the name given to the general area was Mikuyuni whereas the village they lived in was known as Kivuthi, because it was located on a lava flow ground.

All the women and men said that they had been persuaded to leave the village because they had started to become a nuisance to the D.O. Some of the quoted comments regarding their relocation are as shown below:

*.....The government moved us from where we were because it was a town council area.....*

*.....The D.O. moved us because of cutting the few trees and other bushes which had taken many years to establish on the Kivuthi thus rendering the area around the village bare.....*

*.....We were persuaded to leave because we and our small ruminants had become a nuisance to the D.O.....*

Asked how they had become a nuisance to the D.O. they explained that they were brewing illicit beer for sale and when people become drunk, they would go to D.O.'s house to explain their problems hoping to get help from him. The fact is that there is an administrative chain of command for those who like to see and talk to D.O. Firstly, one is supposed to see the village elder then the Assistant Chief then the Chief and finally the D.O. if none of the lower cases would solve the problem. The people living in the *Mikuyuni-Kivuthi* village disregarded that chain of command and always went directly to the D.O.'s house with all kinds of problems some of which were so trivial that even the Village elder could handle them. Livestock were also roaming and becoming a nuisance within the D.O's compound.

The fact that the Kibwezi people had plenty of browse and water for their small ruminants encouraged every householder to keep livestock even though their main occupation was wage earning. This underlines the importance and value of livestock to Kamba community as long as forage and water resources are not limiting.

### **3.3. Changes in Livestock Keeping Practices:**

Once again, in order to document changes in individual and group values and attitudes toward animal husbandry as part of the adjustment process, and also to understand changes in the role of livestock in the subsistence pattern, its contribution to household income and food security in relation to crop production and off-farm activities responses made by various focus group discussants (FGD) and single subject interviewees (SSI) on livestock keeping practices and how they were affected by the shift are reported. Major issues on livestock focus on grazing and watering; welfare and challenges; management practices and; benefits. Although it is not discussed under this chapter, crop food production and off-farm sources of income were viewed as the main day-to-day household food security support systems (see chapter 6).

#### **3.3.1. Changes in Livestock Grazing and Watering:**

Individual and group values and attitudes towards livestock husbandry as part of the adjustment process in pre- and post-relocation areas were affected by grazing/browsing and watering patterns. Broadly speaking, forage and water were more limiting in Muuni settlement scheme than they were in the pre-relocation areas. Under this topic, we hear what various FGD and SSI had to say concerning how they provided forage and water to their livestock both during dry and wet seasons in their pre- and post-relocation areas. Also sources of water and the distances traveled to those sources where possible are noted. Tables 7,10,11 and 12 through to 14, respectively give summaries of the grazing and watering status as reported by both men and women respondents.

### **3.3.1.1. Livestock Grazing As Reported by Chyulu FGD:**

Generally, both women and men focus groups agreed that they had free access to plentiful pasture throughout the year on the Chyulu hills. They said that this was made possible by the vastness of the hills and the adequate precipitation received each year. Forage was reported to be adequate both in wet and dry seasons. On the other hand there was inadequate forage in Muuni. Sources of pasture included grazing on the own-farm, renting pasture from neighbours, exchanging labour for pasture (someone with oxen plow would prepare land of a neighbour in exchange of pasture), borrowing pasture from neighbours who do not own livestock, and the use of crop residues. Critical grazing periods were reported to be dry seasons although there was never adequate forage even during wet seasons because of small individually owned land sizes. Table 7. summarizes what the respondents said regarding the grazing situation in Chyulu and Muuni. For this reason, livestock structure, composition and numbers differed considerably between Muuni and Chyulu as shown in Table 8. Table 9 shows other types of livestock owned both in the Chyulu Hills and Muuni settlement scheme. Cattle, goats and sheep. Goats were kept in the biggest proportion followed by sheep and cattle. The reason for this is that cattle are expensive to buy and to maintain. Sheep have a social taboo attached to them within Kamba community, which explains their small numbers. Mostly this is associated with witch craft and since almost everyone claims to be a Christian they would not like to be mistaken for witch doctors by keeping sheep or eating mutton (Gitunu, 1994).

### **3.3.1.2. Livestock Grazing As Reported by Kalembwani FGD:**

Both women and men FGD agreed that they had a better forage situation in Kalembwani area than in Muuni settlement scheme. They said this was made possible by their previous harmonious living with the Maasai people who had plenty of

Table 7. Chyulu Focus Groups Responses on Livestock grazing, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	OLD SETTLEMENT GRAZING		NEW SETTLEMENT GRAZING	
	KYULU DRY SEASON	KYULU WET SEASON	MUUNI DRY SEASON	MUUNI WET SEASON
KYULU WOMEN (FGD)	-Forage plenty and free	-Forage plenty and free	-Own-farm (poor) -Rental pasture -Pasture vs. Labour -Pasture borrowing	-Own-farm (fair)
KYULU MEN (FGD)	-Forage plenty and free	-Forage plenty and free	-Crop residue -Rental pasture	-Own-farm (fair)

Table 8. Species, composition and structure of total livestock numbers Owned by 30 householders responding to the study, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

LIVESTOCK SPECIES	CHYULU HILLS	MUUNI SCHEME
<b><u>Cattle:</u></b>		
Female (1-2 years)	4	2
Male (1-2 years)	2	2
Female (more than 2 years)	21	7
Male (more than 2 years)	6	7
Female (less than 1 year)	6	1
Male (less than 1 year)	6	2
<b>Total Cattle</b>	<b>45</b>	<b>21</b>
<b><u>Goats</u></b>		
Mature does	331	61
Mature bucks	81	7
Yearling does	152	30
Yearling bucks	26	9
Female kids	101	21
Male kids	83	21
<b>Total Goats</b>	<b>774</b>	<b>149</b>
<b><u>Sheep</u></b>		
Mature ewes	40	5
Mature rams	15	0
Yearling ewes	18	2
Yearling rams	0	0
Female lambs	15	3
Male lambs	4	1
<b>Total Sheep</b>	<b>92</b>	<b>11</b>



Table 9. Other Livestock Species Total Number Owned by 30 householders responding to the study, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

OTHER LIVESTOCK SPECIES	CHYULU HILLS	MUUNU SCHEME
Female donkeys	10	4
Male donkeys	6	3
Chicken	710	271
Log beehives	51	36

pasture in a very vast land. They said this pasture was adequate both in dry and wet seasons. Because of the size of this pasture the people of Kalembwani kept relatively greater proportions of cattle than those who had originated from the Chyulu Hills or Kibwezi area. The grazing pattern assumed what is known as 'wet-dry' grazing system. In this system, animals are taken for grazing away from permanent water sources during wet seasons. Thus they can exploit water pools, ponds and other ephemeral sources of water made possible by the rain. During the dry season, animals are brought near permanent water sources to graze there and make use of this water. As regards Muuni, they said that both dry and wet seasons were critical since there was never adequate forage for livestock. The same reasons as given by Chyulu FGD apply also to the Kalembwani FGD. Sources of livestock forage during dry seasons were reported as own-farm, crop residue, and Kenya Pipeline strip (This is a strip of land about 50 meters wide which traverses the Muuni settlement Scheme and is owned by the Kenya Pipeline Company. It delivers petroleum oil through a pipe from Mombasa refineries to Western Kenya through Nairobi). During wet seasons, the sources of grazing include own-farm, Kenya Pipeline strip and tethering. Table 10 summarizes what the Kalembwani FGD said about grazing situation.

Table 10. Kalemchwani Focus Groups Responses on Livestock grazing, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS INTERVIEW	GROUP	KALEMBWANI DRY SEASON	KALEMBWANI WET SEASON	MUUNI DRY SEASON	MUUNI WET SEASON
KALEMBWANI WOMEN (FGD)		-Free Maasai pasture	-Free Maasai pasture	-Crop residue -Own-farm (poor) -Kenya Pipe Line	-Own-farm (fair) -Kenya Pipe Line
KALEMBWANI MEN (FGD)		-Free Maasai pasture	-Free Maasai pasture	-Crop residue -Own-farm (poor)	-Tethering

### **3.3.1.3. Livestock Grazing As Reported by Kibwezi SSI:**

As can be seen in Table 11, there was little difference between what women and men Single Subject Interviewees (SSI) said regarding the grazing situation in both Kibwezi area and Muuni settlement scheme. Both women and men SSI were in agreement that people in Kibwezi *Mikuyuni-Kivuthi* village kept mainly goats because the area was unsuitable for cattle. The reasons given for this were: there was more browse for goats than there was grass for cattle; the area was rocky and therefore whereas goats would climb easily on rocky areas, cattle would have some difficulties in doing so and; because of the bushes, tsetse flies infested this area and cattle would be more affected by nagana (Trypanosomiasis). All women and men (except one man who had originated from Kibwezi but from a different village), were in agreement that during normal seasons, browse availability was not critical for both dry and wet seasons in *Mikuyuni-Kivuthi* area. The one householder who had come from a different village said that people in the village owned cattle and goats and that during the dry season people would either graze in own-farms or make arrangements to graze in neighbours' farms. He said that people in his area generally had big farms and for this reason, forage availability was not critical during wet and dry seasons. When asked why then he had to move from this area to Muuni, he said he did not have land of his own but resided on his brother's farm.

As regards the grazing situation in the Muuni settlement scheme, both women and men SSI responded more or less like those who had originated from Chyulu and Kalembwani areas.

Table 11. Kibwezi Single Subject Interviewees Responses on Livestock grazing, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

SINGLE SUBJECT INTERVIEWEES	KIBWEZI DRY SEASON	KIBWEZI WET SEASON	MUUNI DRY SEASON	MUUNI WET SEASON
KIBWEZI WOMEN (SS)	-Browse plenty [3]	-Browse plenty [3]	-Own-farm (poor) [1] -Rental pasture [2]	-Own-farm (poor) [1] -Own-farm (fair) [2]
KIBWEZI MEN (SSI)	-Browse plenty [2] -Own-farm (fair) [1] -Pasture borrowing [1]	-Browse plenty [2] -Own-farm plenty [1] -Pasture borrowing [1]	-Crop residue [1] -Own-farm (poor) [2] -Tethering [1]	-Tethering [1] -Own-farm (fair) [2]

### **3.3.2.1. Livestock watering, Sources and Distances As Reported by Chyulu FGD:**

According to Chyulu women's FGD, water on the Chyulu Hills was not a problem in either season. They said that during the dry season, morning dew on the vegetation helped cattle to stay for three days without water. However, on the fourth day, cattle must be taken to permanent sources of water situated at lower parts of the Chyulu hills. These included water wells and streams. As for the sheep and goats, women said that there was enough fleshy browse and forbs covered with dew throughout the year. During the wet season, women said that both cattle and small ruminants had enough water and did not need to go to the permanent water sources for watering. Livestock water was not therefore reported as an important limiting factor.

The story was different when it came to Muuni settlement scheme. First, there were no nearby permanent sources of water; secondly, available water was mainly for sale and; thirdly push bicycles were the main means of water transport. Woe unto those households who did not own bicycles.

Permanent sources of water included:

1. Mathayoni wells, about 6 kilometers south-west from Assistant chief's office at Ilatu shopping centre. This source is not within Muuni settlement scheme. Livestock have to be trekked there because push bicycles can not pass through rocky lava flows which run in an east-west direction and form the boundary between the scheme and the Mathayoni wells. The wells are situated at the bottom of the southern side of the lava flow. Further, this water is to be paid for since it belongs to a community that has paid-up share capitals.
2. Kyaaka wells, about 3.5 kilometers south from Ilatu shopping Centre. These wells are again not within Muuni settlement scheme. They are situated at the bottom of the northern side of the lava flow. They are individually owned and water is available strictly on a cash basis. Those who use this water must use bicycles and other means such as donkeys, wheelbarrows and human backs to take this water home for not only livestock use but also human use. Each 20-litre jerrycan costs two Kenya shillings if

one goes to fetch it. Water from both Mathayoni and Kyaaka wells is very salty and usually unfit for human consumption but choice is limited.

3. Water is also available from water sellers. These are the people, especially young ones, who have push bicycles and can fetch water wherever it is available. They put the water in plastic 20-litre jerrycans (although some may use 30 or 40-litre jerrycans). On average they sell the water for ten Kenya shillings per 20-litre jerrycan.
4. Another source of water is the Kenya Agricultural Research Institute, Kiboko, water tank. This tank is situated only about one kilometer to the north-west of Ilatu shopping Centre. People pay two Kenya shillings per 20-litre container and they have to go and fetch it themselves. This water is piped from river Makindu, about 14 kilometers to the north-west of Ilatu shopping Centre. This source is not entirely reliable because sometimes the water pump breaks down or the diesel runs out. During periods like these, some people are forced to go all the way (14 km.) to fetch it directly from the river.

The above 4 are the dry-season sources of water mentioned by Chyulu women FGD although they are by no means exhaustive. As regards sources of water during the wet season, women said this was better because they could make use of water collections in the form of local pools, ponds and barrow-pits found on the roads and other places. Although this water is muddy and highly contaminated people do not hesitate to use it both for their livestock and families.

According to the Chyulu men FGD, the following sources are used during dry seasons.

1. River Makindu (at a watering point known as *Kwa-venge*) was used during dry seasons. This is again a 14 km distance. Animals are either trekked there or push bicycles and other means would be used to fetch water.
2. Kamunyuni wells situated about 18 kilometers to the east of Ilatu shopping Centre is another dry-season source of water used mainly for those people who own cattle. Both the river Makindu and Kamunyuni wells (springs) are situated outside of the Muuni settlement scheme. Like women, men mentioned same

sources of water during wet seasons. But because of the low, erratic and unreliable rain in this area, these sources can not be relied upon for long. They last for only a short period of time and then people have got to revert to their usual long-distant water sources.

It is interesting to note that during dry season, whereas women seem to mention sources of water near the settlement, men mention long distant public water sources probably because that is where they trek their livestock for free water.

### **3.3.2.2. Livestock Watering, Sources and Distances As Reported by Kalembwani FGD:**

As far as both men and women FGD originating from Kalembwani were concerned, water was not a problem either in dry and wet seasons in the Kalembwani area. During rainy seasons, they would take their animals away from the only permanent river, *Ikolya* mentioned by both groups and graze them where water was available in form of pools and other ephemeral sources resulting from rainfall. As far as Muuni is concerned, both groups agreed that water availability was critical in both seasons. Men said that Kamunyuni wells, about 16 km to the East of Ilatu shopping Centre was the main source of water during the dry season. Pools and other rain water collections were used during the wet season. Table 13 summarizes what these two groups said about the water situation.

### **3.3.2.3. Livestock watering, Sources and Distances As Reported by Kibwezi SSI:**

Except for one interviewee, all the others who originated from Kibwezi were in agreement that water was not a problem in both seasons in Kibwezi. They mentioned that there was a permanent river and that there was always water available from taps at the railway quarters for human consumption. However, at Muuni, water once again was mentioned as a big problem in both seasons as already summarized in Table 14.

Table 12. Chyulu Focus Groups Responses on Livestock water situation, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS GROUP DISCUSSION	OLD SETTLEMENT WATERING		NEW SETTLEMENT WATERING	
	KYULU DRY SEASON	KYULU WET SEASON	MUUNI DRY SEASON	MUUNI WET SEASON
KYULU WOMEN (FGD)	-Morning dew -Downhill wells/stream -Succulent forage	-Morning dew	-Mathayoni wells -Water sellers -Buy from source -Kyaaka wells	-Local pools
KYULU MEN (FGD)	-Downhill wells/stream -Roof catchment -Water sellers	-Succulent forage -Roof catchment -Water sellers	-River Makindu -River Kamunyuni	-Local pools



Table 13. Kalemwani Focus Groups Responses on Livestock water situation, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

<i>FOCUS DISCUSSION</i>	<i>KALEMBWANI DRY SEASON</i>	<i>KALEMBWANI WET SEASON</i>	<i>MUJUNI DRY SEASON</i>	<i>MUJUNI WET SEASON</i>
<i>KALEMBWANI WOMEN (FGD)</i>	-River Ikolya	-Local pools -Ephemeral streams	-Mathayoni wells -River Makueni -Buy from source	-Local pools
<i>KALEMBWANI MEN (FGD)</i>	-River Ikolya	-Local pools -Ephemeral streams	-River Kamunyuni	-Local pools

Table 14. Kibwezi Single Subject Respondents on Livestock water situation, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

SINGLE SUBJECT INTERVIEWEES.	KIBWEZI DRY SEASON	KIBWEZI WET SEASON	MUUNI DRY SEASON	MUUNI WET SEASON
KIBWEZI WOMEN (SSI)	-River Kibwezi (3) -Tap water (2)	-River Kibwezi (3) -Tap water (1)	-Mathayoni wells (1) -River Makindu (2) -Buy from source (2) -River Kamunyuni (1)	-Local pools (3)
KIBWEZI MEN (SSI)	-River Kamunyuni (1) -River Kibwezi (2)	-Local pools (1) -River Kibwezi (2)	-Mathayoni wells (1) -River Makindu (1) -Buy from source (3) -River Kamunyuni (1)	-Local pools (3)

### **3.3.3. Livestock Welfare Challenges:**

Another area where Individual and group values and attitudes towards livestock husbandry as part of the adjustment process in pre- and post-relocation areas were adversely affected is the livestock welfare and the general challenges on livestock. In this topic challenges that threaten livestock welfare are reported as they are perceived by both men and women in their former areas of settlement and in their current settlement area. The main areas of reporting include diseases, predators, theft, nutrition and adaptation. Tables 15 to 19 show the main responses made concerning this topic.

#### **3.3.3.1. Livestock Diseases as Reported by Chyulu FGD:**

According to men, diseases were uncommon in the Chyulu Hills other than rare epidemics. The rare livestock diseases experienced were of pneumonic nature probably due to elevation and exposure to cold winds. Such diseases were treated using locally known herbs such as *Muvuavui* tree. Veterinary services were far away from where people lived on the Chyulus. However, a few knowledgeable people could go and buy veterinary medicines and treat their own animals. These observations were in agreement for both men and women FGD. In comparison, Muuni was reported to be notorious for livestock diseases which include both tickborne and tsetse-borne diseases. These were especially a menace when people first settled there because the land was virgin and bushy, a condition which favours tick and tsetse fly habitation. Tsetse flies posed a health hazard not only to livestock but also to humans. To livestock, tsetse flies transmit a disease known as *Nagana* (trypanosomiasis) and to humans, a different one known as sleeping-sickness although the real danger for human health was posed by the presence of mosquitoes, which would cause an epidemic of Malaria especially during rain seasons. Ticks transmit anaplasmosis diseases mainly because theiriolosis diseases are uncommon in the area. Depending on the individuals' circumstances, one could either use ethno-vet or para-vet treatment. For human treatment, people used nearby hospitals like and dispensaries. If the disease was less serious, people would use over the counter

medicines. Unfortunately, the only close District hospital and other dispensaries and chemists are at Makindu town, about 14 kilometers away from the scheme. Table 15 summarizes the disease situation as reported by Chyulu FGD.

Table 15. Common Livestock Diseases-Muuni versus Chyulu, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT (LIVESTOCK DISEASES)	NEW SETTLEMENT (LIVESTOCK DISEASES)
KYULU (FGD)	WOMEN	-Very rare .CCPP	-Common .Tick-borne .Tryps .Helminths .CCPP
KYULU MEN (FGD)		-Very rare .Occasional epidemics	-Common .Tick-borne .Tryps

### 3.3.3.2. Livestock Diseases as Reported by Kalembwani FGD:

Men FGD said there were some livestock diseases in Kalembwani which included Nagana during wet seasons and contagious caprine pleuro-pneumonia (CCPP) in small ruminants during dry season. On the other hand women said that diseases were rare except when they have occasional epidemics. The majority of the people of Kalembwani preferred to buy veterinary medicines and treat their own animals or call the veterinarian especially if it was a complicated case. So all the three methods of livestock treatment were used in Kalembwani area namely, veterinary medicine and services, ethno-vet and paravet. Ethno-vets were well known to Maasai people especially the elderly ones. In the words of one woman and one man, respectively.

*.....Ethno-vet was practiced by old people. Mwatha herb soot treated mavui (pneumonia) in both cattle and small ruminants. Maasai people are expert in herbal medicines.....*

*.....Sometimes we would call Mr. Kanasye, the ethnvet and request him to help in case of disease. He would not be expected to be paid in cash but only by word "Thank-you" and also in "kind". Some of the herbs that he used included Mwaitha and Itulu for Kitathya (a tickborne disease) and Mavui (Pneumonia-related) diseases, respectively.....*

Table 16. Common Livestock Diseases-Muuni versus Kalemchwani, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT (LIVESTOCK DISEASES)	NEW SETTLEMENT (LIVESTOCK DISEASES)
KALEMBWANI WOMEN (FGD)		-Rare .Tick-borne .Tryps	-Common .Tick-borne .Tryps
KALEMBWANI MEN (FGD)		-Rare .Tick-borne .Tryps .CCPP	-Common .Tick-borne .Tryps

Regarding Muuni, nagana and tickborne diseases are reported as being rampant by both groups and that those who can afford to buy acaricide spray their animals, others pluck off the ticks. Table 16 gives a summary of what men and women FGD originating from Kalemhwani said about the animal disease situation. In the words of one woman:

*.....More people in Muuni use para-vet services because the people experienced with herbal medicine have died out of old age..... we see that our old cows die due to lack of energy and water while our small ruminants die due to dust and lack of water, and pneumonia-related diseases.....*

### **3.3.3.3. Livestock Diseases as Reported by Kibwezi SSI:**

Except for one interviewee, all those who had originated from Kibwezi agreed that diseases were not rampant in Kibwezi and that whenever some were noted, veterinary officers who lived near-by would be consulted immediately. However, one of them was in disagreement because of the part of Kibwezi he had come from. At least one man mentioned the problem of worm infestation which is to be expected for those who rear small ruminants. And in Kibwezi that was their main livestock. Veterinary drugs and services were close to people in Kibwezi, being Divisional headquarters where the veterinary officer had the office. However, depending on the area of Kibwezi individual households originated from, access to veterinary services and disease problems differed.

One man had this to say concerning Kibwezi where he had come from:

*.....In Kibwezi, the part I originated from, mortality could be as high as six goats especially kids per day. The cause for this was mainly pneumonia.....*

About Muuni, unlike other Kibwezi respondents, this one said that the disease situation in Kibwezi was worse than in Muuni. Others however, agreed that Muuni had a serious



tick, tsetse, worm and pneumonia-related diseases and that both ethno and veterinary services were being used. Table 17 gives the summaries of disease situation as reported by Kibwezi SSI.

It is important to note that whereas the general agreement by all men and women focus group and single subject interviewees was that livestock diseases were rare in their pre-relocation areas, there were some differences about the diseases mentioned between people of different origin and between sexes in Muuni. For instance, Chyulu women mentioned the presence of worms whereas their men counterpart did not. On the other hand none of Kalemchwani respondent mentioned the presence of worms. Presence of worms in Muuni was reported by both men and women. However, only men mentioned their presence in Kibwezi. It appears that the problem of worms is mainly associated with small ruminants. This does not mean cattle do not suffer from worms but probably the effect is more pronounced in the former. Kibwezi and Muuni were notorious for worm infestation. Incidentally, these are the same areas where majority of householders could not afford to keep cattle.

Table 17. Common Livestock Diseases -Muuni versus Kibwezi, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT (LIVESTOCK DISEASES)	NEW SETTLEMENT (LIVESTOCK DISEASES)
KIBWEZI (SSI)	WOMEN	-Rare (2) -Very rare (1) .Occasional epidemics (1)	-Common (3) .Tickborne (2) .Helminths (2) .CCPP (1)
KIBWEZI MEN (SSI)		-Rare (1) -Common (1) -Very rare (1) .Helminths (1) .CCPP (1)	-Common (1) -Non-response (2) .Tickborne (1) .Helminths (1) .CCPP (1)

### **3.3.4. Livestock Predators:**

Individual and group values and attitudes towards livestock husbandry as part of the adjustment process was not a limiting factor both in pre- and post-relocation areas. Under this topic, I have examined and reported how people viewed the presence and problems posed by wild life to their livestock. Generally speaking, livestock predation was not a big issue across all the stakeholders in this study. However, it was interesting to hear some of the opinions. Table 18 summarizes those responses.

#### **3.3.4.1. Livestock predators As Reported by Chyulu FGD:**

Men and women differed on this issue. Whereas, women mentioned only occasional, rare, lion attack especially in bushy areas of Chyulu, men said there was some considerable predation upon their livestock perpetrated by lions, hyenas, leopards, and monkeys. They said that whereas lions attacked all classes of livestock, hyenas and leopards mainly attacked small ruminants. Monkeys attacked kids and lambs. They however said this was not very common. As regards Muuni, women and men had these quotes, respectively:

*... ..there are some occasional hyenas but what pose the real danger are “human lions”.*

*... ..no livestock predation except for the birds of prey which attack our chicken.*

Table 18. Livestock Predation Situation-Muuni versus Chyulu versus, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT (LIVESTOCK PREDATION)	NEW SETTLEMENT (LIVESTOCK PREDATION)
KYULU (FGD)	WOMEN	-Occasional Lion	-Occasional Hyena -Human Predator
KYULU MEN (FGD)		-Occasional Lion -Occasional Hyena -Human predator -Occasional Leopard	-Occasional prey bird

### 3.3.4.2. Livestock Predators As Reported by Kalembwani FGD:

As supported by Table 19, women said that there were rare cases of lion and leopards attacking cattle and small ruminants in the pre-relocation areas whereas men had the following to say:

*.....In Kalembwani, lions would occasionally attack but stray animals would be attacked by hyenas. Dry season is notorious for livestock predation.*

Men (FGD)

About Muuni scheme, both men and women had this to say,

*.....cases of predation by leopards and hyenas and monkeys removing goats' eyes before they eat them and also eating chicken in Boma 5 are known. Lion encounter was reported only once.*

Men and Women (FGD)

*.....Vultures attack kids and lambs whereas monkeys attack kids, lambs and adult tethered small ruminants.*

Women (FGD)

Table 19. Livestock Predation Situation-Muuni versus Kalemchwani, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT PREDATION	NEW SETTLEMENT PREDATION	(LIVESTOCK)
KALEMBWANI WOMEN (FGD)		-Occasional Lion	-Occasional monkey	
		-Occasional Leopard	-Occasional prey bird	
KALEMBWANI MEN (FGD)		-Occasional Lion	-Occasional Lion	
		-Occasional Hyena	-Occasional Hyena	

#### **3.3.4.3. Livestock predation as reported by Kibwezi FGD:**

Three of those interviewed about livestock predation in Kibwezi SSI, two men and one woman said they were not aware of any livestock predation in either Kibwezi or in Muuni. Others had slightly varying experiences but generally, all were in agreement that predation was not a problem in the Kibwezi area as Table 20 shows. However, an interesting comment was made by one woman regarding predation in Muuni:

*Some people like Mr..... (name withheld) transform themselves into hyenas and attack livestock. Others change themselves into vultures.*

This is certainly a superstition but such superstitions are very common among Kamba animistic beliefs. This shows that livestock theft in Muuni is rife and that people will use all kinds of tricks to steal them. Once they are stolen, they can either be killed for meat or sold for cash. This reflects food insecurity problem.

Table 20. Livestock Predation Situation-Muuni versus Kibwezi, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT PREDATION	(LIVESTOCK)	NEW SETTLEMENT PREDATION	(LIVESTOCK)
KIBWEZI (SSI)	WOMEN	-Occasional prey bird (1) -None (2)		-Occasional Hyena (1) -Human/Hyena or eagle transformation (1) -None (1)	
KIBWEZI MEN (SSI)		-Common Leopard (1) -Occasional Lion (1) -None (1)		-Predation uncommon (1) -None (1) -Common in early settlement (1)	



### 3.3.5. Livestock Theft:

Under this topic, we shall see how the individual and group values and attitudes toward animal husbandry were perceived and viewed in respect to theft during the pre- and post-relocation eras. Generally speaking people in Muuni, regardless from where they originated, agreed that theft was more rampant in Muuni than it was in their former areas of settlement as shown in Table 34. This shows that the relocation has had stressing effect on people that promoted some of them to engage in theft in order to meet basic needs such as food supply. The following quotes came from the respondents:

*.....there was no livestock theft in Chyulu Hills only occasional Maasai raid. The local people were self-sufficient.....*

(Chyulu Men FGD)

*.....livestock theft is very common here in Muuni because people are poor. Quick action immediately after theft is necessary if the stolen animals are to be recovered. Mostly they are taken in the night to the local and distant livestock markets such as Kambu, Kasayani and Emali. Rigorous and highly coordinated plan of action calls for simultaneous follow-up to all those markets which must be done early in the morning before the animal is sold.....*

(Kalembwani women FGD)

*.....in Kalembwani, occasional Maasai raiders would hotly and rigorously be followed using bows and arrows and sometimes such pursuits would be rewarded by recovering the stolen animals while in some cases the pursuit would prove to be futile.....*

(Kalembwani women FGD)

*.....there was no livestock theft in Kibwezi because Kenya police, administrative police and other public security personnel were residing nearby. If ever any*

*livestock theft was reported there, it must have been perpetrated by outsiders and not locals.....*

*.....some human who transform themselves into hyenas and vultures do so because they fear being detected and be speared or arrowed.....*

(Kibwezi Woman SSI)

Table 34. Livestock Theft Situation as Summarized by all FGD and SSI, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

<i>FOCUS DISCUSSION</i>	<i>GROUP</i>	<i>OLD SETTLEMENT (LIVESTOCK THEFT)</i>	<i>NEW SETTLEMENT (LIVESTOCK THEFT)</i>
<i>KYULU (FGD)</i>	<i>WOMEN</i>	-None	-Very common
<i>KYULU MEN (FGD)</i>		-Very rare Maasai raid	-Very common
<i>KALEMBWANI WOMEN (FGD)</i>		-Occasional Maasai raid	-Very common
<i>KALEMBWANI MEN (FGD)</i>		-Occasional Maasai raid	-Very common
<i>KIBWEZI (SSI)</i>	<i>WOMEN</i>	-None (3)	-Common (2) -Very common (1) -Human/Hyena or eagle transformation (1)
<i>KIBWEZI MEN (SSI)</i>		-Rare (1) -Very rare (1) -None (1)	-Common (1) -Very common (1)

### 3.3.6. Livestock Nutrition and Adaptation:

Individual and group values and attitudes towards livestock husbandry as part of the adjustment process was heavily affected by nutrition and adaptation to a new environment. By livestock nutrition we mean forage for livestock subsistence and whether that forage is there in adequate amounts or not. As the majority of people in Muuni area do not worry about the nutritive value of their own diet but simply the bulk to fill their stomachs, so they view their livestock in a similar fashion.

Animals would be said to be doing well if they have access to enough forage and water year-round and if they are protected from disease predisposing factors and predators. Generally speaking all groups and individuals were in agreement that these two livestock aspects were better in their former areas than they were in Muuni. Table 21 summarizes the main issues about nutrition and adaptation as perceived by the FGD and SSI, and a few quotations will make the picture clearer.

The following comments were more or less common across all stakeholders.

*.....in Chyulu Hills we had plenty of grass, shrubs, and forbs year-round and big foraging area free for all. Our livestock therefore did well.*

*.....here in Muuni, forage is extremely insufficient and the foraging area is limiting and strictly individual and private. Livestock production is, therefore, poor.*

(Chyulu women FGD).

This helps us understand that forage situation in Muuni was poor and for that reason animals could not get proper nutrition. This discourages people from keeping livestock and in turn, its significance in the agro-pastoral nexus becomes less important.

Table 21. Livestock Nutrition Status As Summarized by all FGD and SSI, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT (LIVESTOCK NUTRITION)	NEW SETTLEMENT (LIVESTOCK NUTRITION)
KYULU (FGD)	WOMEN	-Adequate yearlong	-Inadequate in dry season
	MEN (FGD)	-Adequate yearlong	-Inadequate in dry season
KALEMBWANI (FGD)	WOMEN (FGD)	-Adequate yearlong	-Inadequate in dry season
	MEN (FGD)	-Adequate yearlong	-Inadequate in dry season
KIBWEZI (SSI)	WOMEN	-Adequate for small ruminants (3) -Fairly adequate for cattle (1)	-Inadequate in dry season (1) -Inadequate for cattle in dry season (1)
	MEN (SSI)	-Adequate yearlong (1) -Adequate for small ruminants (2) -Fairly adequate for cattle (1)	-Inadequate in dry season (1) -Inadequate for cattle in dry season (1) -Fairly adequate, small ruminants in dry season (1)

Table 22. Livestock Adaptation Status As Summarized by all FGD and SSI, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT ADAPTATION	NEW SETTLEMENT ADAPTATION	NEW SETTLEMENT (LIVESTOCK ADAPTATION)	(LIVESTOCK)
KYULU (FGD)	WOMEN	- Very good	- Poor	- Poor	
KYULU MEN (FGD)		- Very good	- Poor	- Poor	
KALEMBWANI WOMEN (FGD)		- Good	- Poor	- Poor	
KALEMBWANI MEN (FGD)		- Good	- Poor	- Poor	
KIBWEZI (SSI)	WOMEN	- Good for shoat (3) - Poor for cattle (2) - Fair for cattle (1)	- Poor for cattle (3) - Fair for shoat (3)	- Poor for cattle (3) - Fair for shoat (3)	
KIBWEZI MEN (SSI)		- Good for shoat (3) - Poor for cattle (2) - Fair (1)	- Poor for cattle (2) - Fair for shoat (2)	- Poor for cattle (2) - Fair for shoat (2)	

### **3.3.7. Livestock Management Practices:**

Individual and group values and attitudes towards livestock husbandry as part of the adjustment process was affected by management practices. Livestock management practices to be discussed in this topic include animal labour, feed supplementation and disease control techniques. The three management practices mentioned above are crucial elements of production (livestock breeding practice was reported as being free mating throughout the year regardless of the settlement area). It is therefore important to understand how Muuni people perceive these three areas of livestock management practices and how they were affected by the relocation.

#### **3.3.7.1. Livestock Labour and its Source:**

Generally, there were some variations in what people said about livestock labour and its source depending on their origin. For instance, whereas both Chyulu men and women generally agreed about sources being family members and hiring in Chyulu and Muuni, Kalembwani FGD indicated that the source of livestock labour was more group based than family-affiliated.

Sources of labour for livestock management were categorized as family, group, partnership, hiring, and in some instances boarding. Where none of the above were in use especially for grazing, then animals would be tethered. But the main point to emerge is that people were more organized and financially well-off before. In the pre-relocation areas they could employ workers for their livestock labour. Table 23 summarizes the main issues brought out by various FGD and SSI.

Table 23. Livestock Labour and its source as perceived by all FGD and SSI, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT LABOUR SOURCE	(LIVESTOCK SOURCE)	NEW SETTLEMENT (LIVESTOCK LABOUR SOURCE)
KYULU (FGD)	WOMEN	-Adults -Children -Occasional hired labour		-Adults -Children -Rare hired labour
	MEN (FGD)	-Family adults -Family children -Considerable hired labour		-Family adults -Family children -Rare hired labour
KALEMBWANI (FGD)	WOMEN	-Combine (partnership/group) shift		-Tethering -Rare hired labour
	MEN	-Combine (partnership/group) shift -Combine (partnership/group) contribute		-Family adults -Family children
KIBWEZI (SSI)	WOMEN	-Family adults (2) -Family children (2) -Rare hired labour (1) -Occasional hired labour (1)		-Family adults (3) -Family children (2) -Boarding (1) -Tethering (1) -Rare hired labour (1)
	MEN (SSI)	-Family adults (1) -Family children (2) -Occasional hired labour (1) -Tethering (1) -Zero grazing (1)		-Family adults (3) -Family children (2) -Boarding (1) -Tethering (1) -Rare hired labour (1)



### **3.3.7.2. Livestock Feed Supplementation:**

Except for one farmer in the interview group originating from Kibwezi who mentioned that he practiced zero grazing at Kibwezi, all the others said that they did not supplement their animals or said it was very insignificant when they did. According to all the study groups, the only time of supplementation is after harvest when they let animals free to feed on the crop residues. This feeding may be important but Kibwezi farmers do not seem to depend on it or count it as important. However, those who own cattle, value crop residue feeding especially during dry seasons. Maize stalks stored in trees to be fed to cattle in times of forage scarcity is a common sight in the Muuni scheme (Plate 7). Table 24 brings out main responses of FGD and SSI concerning supplementation.

It is important to note that supplementation is not viewed as important either in pre-relocation areas or in Muuni although a few people in Muuni, especially those who own cattle store some maize stalks in trees to feed the cows in dry seasons. However, immediately after harvest, livestock are let loose to feed on crop residues.

Plate 6. Typical onset of a dry season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Plate 7. Typical Maize stock storage for livestock supplementation during dry season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

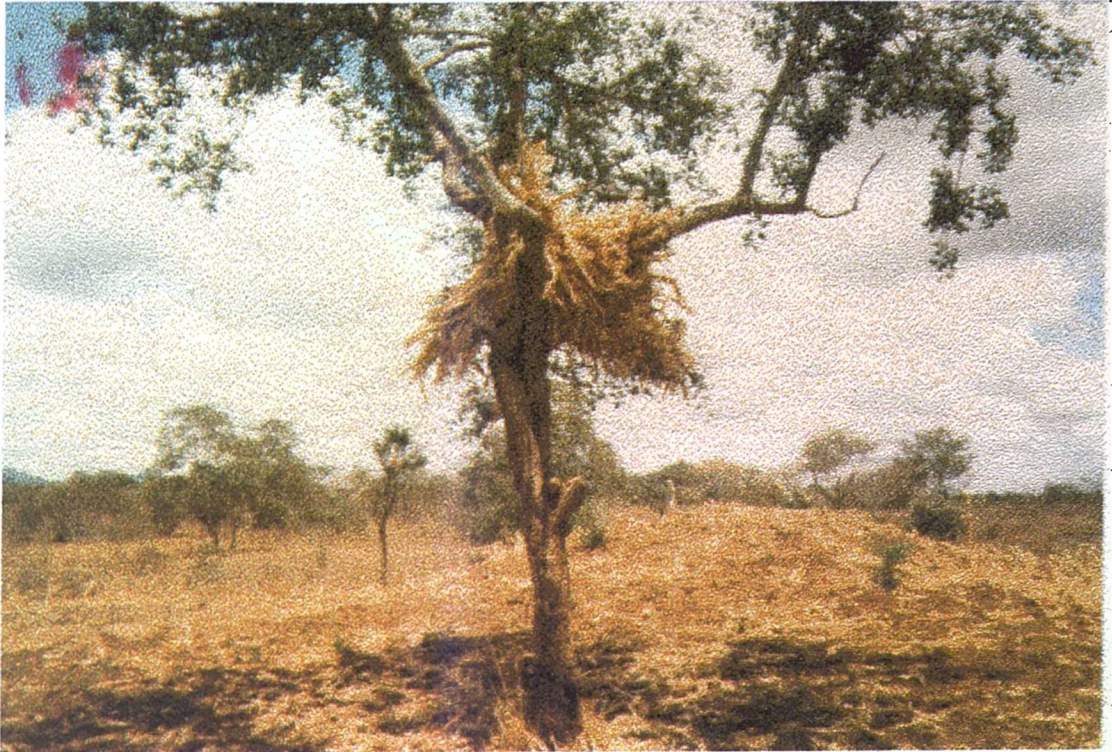


Plate 8. Typical Kamba Short Horn Zebu cattle, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

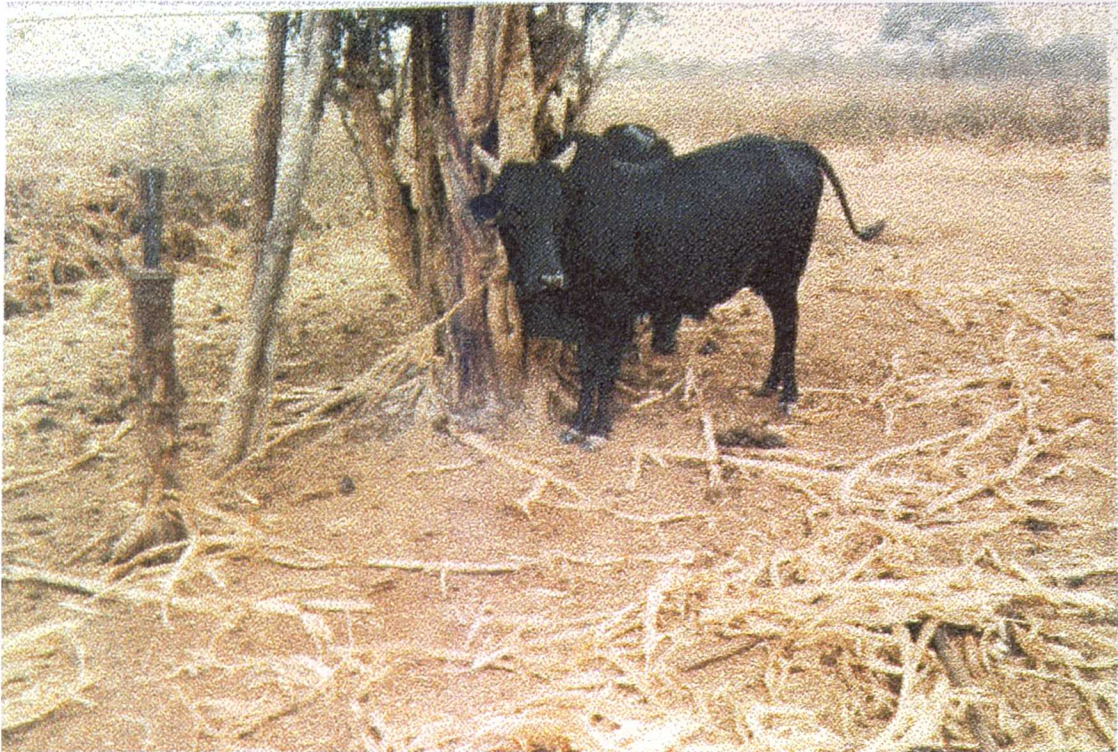


Table 24. Livestock Feed Supplementation as perceived by all FGD and SSI, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

<i>FOCUS DISCUSSION</i>	<i>GROUP</i>	<i>OLD SETTLEMENT (LIVESTOCK FEED SUPPLEMENTATION)</i>	<i>NEW SETTLEMENT (LIVESTOCK FEED SUPPLEMENTATION)</i>
<i>KYULU (FGD)</i>	<i>WOMEN</i>	-Non-existent or negligible	-Low level crop residue in dry season
<i>KYULU MEN (FGD)</i>		-Non-existent or negligible	-Low level crop residue in dry season
<i>KALEMBWANI WOMEN (FGD)</i>		-Non-existent or negligible	-Low level crop residue in dry season
<i>KALEMBWANI MEN (FGD)</i>		-Non-existent or negligible	-Low level crop residue in dry season
<i>KIBWEZI (SSI)</i>	<i>WOMEN</i>	-Non-existent or negligible (3)	-Low level crop residue in dry season (3)
<i>KIBWEZI MEN (SSI)</i>		-Zero grazing supplementation (1) -Non-existent or negligible (2)	-Low level crop residue in dry season (3)

### 3.3.7.3. Livestock Disease Control Techniques:

Although livestock spraying (or dipping) and vaccination programs respectively, are the most effective ways of controlling tickborne and viral diseases in livestock, these practices were rarely mentioned in connection with livestock management practices in pre- and post-relocation areas. When livestock fell sick, people sought treatment methods convenient for their circumstances.

Three main ways of treating sick livestock were mentioned by both FGD and SSI. These were Veterinary medicines and services; para-veterinary (para-vet) services and ethno-veterinary (ethno-vet) services. Some knowledgeable farmers buy veterinary medicine and treat their own animals. Table 25 summarizes what was said about livestock disease control techniques.

Livestock owners do not have much choice when their animals fall sick. Regardless of where they are they have to seek some form of treatment to try and save the animal. However, it is noted that distance to where the conventional veterinary services are available and the economic status play important roles in deciding which services to access farmers would employ to treat their animals. Two people, one man in Chyulu FGD and one woman in Kibwezi SSI had this to say regarding treatment of animals in the Chyulu Hills and Kibwezi area, respectively:

*.....Herbal treatment were used mainly because veterinary services were far away. Those who were knowledgeable and financially able bought veterinary medicines and treated their own animals.....*

*.....use of veterinary medicines and services was preferred to use of herbs in Kibwezi because the veterinary office was nearby.....*

Table 25. Livestock Disease Treatment Methods as perceived by all FGD and SSI, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT TREATMENT	NEW SETTLEMENT (LIVESTOCK TREATMENT)	NEW SETTLEMENT (LIVESTOCK TREATMENT)
KYULU (FGD)	WOMEN	-Ethno-veterinary	-Ethno-veterinary	-Para-veterinary -Ethno-veterinary
KYULU MEN (FGD)		-Ethno-veterinary -Purchased drugs		-Para-veterinary -Ethno-veterinary
KALEMBWANI WOMEN (FGD)		-Veterinary services -Ethno-veterinary		-Para-veterinary -Ethno-veterinary
KALEMBWANI MEN (FGD)		-Veterinary services -Ethno-veterinary		-Para-veterinary
KIBWEZI (SSI)	WOMEN	-Veterinary services mainly (3)		-Veterinary services mainly (2) -Ethno-veterinary mainly (1)
KIBWEZI MEN (SSI)		-Veterinary services mainly (2) -Ethno-veterinary mainly (1) -Unmentioned (1)		-Veterinary services mainly (1) -Ethno-veterinary mainly (1) -Unmentioned (1)

### **3.3.8. Livestock Main Benefits and Other Uses:**

One of the objectives of this study is to determine the food security status as a result of the adjustment process. In this topic the many livestock uses aimed at meeting household food security as a priority requirement, monetary needs and social/customary obligations are reported. It is not common for households to sell their livestock unless there is a dire need to do so. The main reasons why livestock are sold include need for school fees, medical services, house construction and purchase of food.

Main day-to-day uses of livestock involve direct supply of food in form of milk, ghee, meat and animal fat. Of the four, milk is the most important. Milk has diverse uses both intra-and inter-household. Obtaining meat and animal fat means killing the animal itself and this is not the best option, since livestock are highly treasured for any emergency. It is wise to sell such an animal and obtain money which could be used for multiple household basic needs including buying meat from a local butcher. However, in some occasions, slaughtering is necessary. Such occasions may include celebrations on special-days and holidays. In such days, some families slaughter a goat but rarely a cow. If a cow is to be slaughtered, then it must be a big occasion involving a clan or an extended family re-union. Other occasions that may require a bull slaughter are political where a distinguished member of parliament or a prominent civil servant such as District or Provincial Commissioner; permanent secretary; member of parliament; and head of state is invited as a guest to officiate in a function relating to community project. Other occasions relating to custom for instance wedding, circumcision, witchcraft may also require a large animal sacrifice. Animals can also be used as beast of burden especially so when plowing the land and pulling carts. In some cases they can be used for barter trade especially involving foodstuffs. Although animals are good source of farm manure, neither FGD nor SSI mentioned this fact though farm manuring might have been going on but viewed as an unimportant practice both in pre- and post-relocation areas.

People indicated that some of those uses of livestock were just sweet memories of the past since they are no longer possible under Muuni conditions. For such a system to operate smoothly and efficiently, livestock keeping should not be limited by such factors



like insufficient grazing land, water and diseases which is actually the case in Muuni. The responses FGD and SSI made regarding livestock importance in their former places compared to their current settlement as shown in Tables 26 and 27, make this much clearer and indicate that the poor circumstances in Muuni may be eroding the cultural capital of the settlers. However, livestock benefits were more appealing under the pre-relocation situations.

### **3.3.9. Conclusions:**

- ◆ The foregoing chapter helps us understand the value attached to livestock by the Kamba people as individuals and as a community in meeting household food security and other socio-cultural obligations. Livestock forage, water and health are crucial necessities required in order to support a viable livestock production.
- The pre-relocation herds and flocks were superior to the post-relocation ones in structure, composition and numbers. This was made possible by availability of adequate forage, water, and less disease incidences throughout the year the conditions which were miserably critical within Muuni settlement scheme.
- In general all aspects of livestock husbandry were adversely affected by the relocation and for this reason most householders kept one or two small ruminants. This in turn affected the importance of livestock within the context of agro-pastoral nexus thereby giving it secondary or even tertiary position in household food security.

Table 26. Livestock Sales Benefits as perceived by all FGD and SSI, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT (LIVESTOCK SALES)	NEW SETTLEMENT (LIVESTOCK SALES)
KYULU (FGD)	WOMEN	-School costs mainly	-Food purchase [1st.] -Other domestic needs [2nd.]
	MEN (FGD)	-School costs [1st.] -Clothing [2nd.] -Construction work [3rd.]	-School costs [1st.] -Clothing [2nd.] -Food purchase [3rd.]
KALEMBWANI WOMEN (FGD)		-School costs [1st.] -Food purchase [2nd.] -Construction work [3rd.]	-Insignificant sale
	MEN (FGD)	-School costs mainly	-Insignificant sale
KIBWEZI (SSI)	WOMEN	-School costs (2) [1 <sup>st</sup> , 2nd.] -Food purchase (3) [1st., 1st., 3rd.] -Hospital bill (3) [2nd., 2nd., 3rd.]	-School costs (1) [2nd.] -Food purchase (1) [1st.] -Hospital bill (1) [3rd.] -General domestic needs mainly (1) -Unmentioned (1)
	MEN (SSI)	-School costs (2) [1 <sup>st</sup> , 1st.] -Food purchase (2) [mainly, 2nd.] -General domestic need mainly (1)	-School costs (1) [1st.] -Food purchase (2) [1st., 2nd.] -General domestic need mainly (1)

Table 27. Livestock Other Benefits as perceived by all FGD and SSI, Muuni Settlement Scheme, Makuini District, Kenya, 1997.

FOCUS DISCUSSION	GROUP	OLD SETTLEMENT (LIVESTOCK OTHER BENEFITS)	NEW SETTLEMENT (LIVESTOCK OTHER BENEFITS)
KYULU (FGD)	WOMEN	-Milk -Bride price -Witch doctor's fee -Cereal/pulses exchange for meat -Big public occasion slaughter	-Milk -Rare special family occasion slaughter
	MEN (FGD)	-Milk -Bride price -Witch doctor's fee -Public donation -Big public occasion slaughter -Beast of burden (plow)	-Rare special family occasion slaughter -Bride price -Beast of burden (plowing and towing)
KALEMBWANI WOMEN (FGD)	WOMEN	-Milk -Occasional family slaughter for meat -Bride price -Other cultural obligations -Big public occasion slaughter	-Unmentioned/insignificant
	MEN (FGD)	-Milk -Bride price	-Unmentioned/insignificant
KIBWEZI (SSI)	WOMEN	-Milk (3) [goats' mainly] -Rare special family occasion slaughter. (2)	-Milk (2) [only in wet season] -Rare special family occasion slaughter. (1)
	MEN (SSI)	-Milk (2) [goats' mainly] -Rare special family occasion slaughter. (2) -Unmentioned/insignificant (1)	-Milk (2) [negligible amount] -Unmentioned/insignificant (1)

- Small private land holdings, unreliable rainfall and harsh environment are the conditions responsible for less lucrative livestock industry yet they are the very ones that characterise Muuni settlement scheme.
- Although livestock slaughter for household meat requirement was rare both in pre-relocation and post-relocation areas, livestock products such as milk, and ghee made considerable impacts on the household food security in the former than in the latter areas.
- Though livestock production is traditionally considered superior to crop production in the agro-pastoral nexus within semi-arid areas of Kenya, the very opposite becomes true once these areas are sub-divided into small individual holdings.
- In view of the foregoing conclusions, this study affirms that the role of livestock production in contributing to food security and economy of agro-pastoralists in general and of Muuni community in particular is adversely affected by involuntary and unplanned relocation and the subsequent fledgling small-scale private land holdings.

## **CHAPTER 4.**

### **IMPACT OF RELOCATION ON SOCIAL SYSTEMS**

#### **4.1. Introduction:**

One of the study objectives was to analyse changing social relations between individuals and groups which result from relocation to semi-arid areas and the consequent modification of the subsistence systems. This chapter carries us through all the social changes and adjustments people encountered as a result of the relocation. It analyses and describes what study respondents said regarding social system disruptions, loss of personal property and community social amenities. Further, household gender roles and sharing of goods and services are analysed and described as they are perceived by the study respondents. Additionally, an analysis and description of ethno-tolerance in terms of interaction and occupation and, presence of welfare agencies and their contribution to the Muuni community is given and seeks to explain householders perception of the matter. Finally, the peoples' perceived pre- eviction planning and immediate improvement strategies as well as social disputes and their solutions are analysed and described.

#### **4.2. Social Interaction and Social Change:**

Information for this chapter is based on what FGD and SSI said concerning inquiries of a social nature. The inquiries include the effects of relocation on social set-ups and family cohesion; personal and household property; community social amenities; roles played by household members of the family; inter-household food sharing; farm and livestock labour sharing; resident non-Kamba ethnic groups; non-Kambas occupation and interaction; agencies contributing to peoples' welfare; perceived or suggested pre-planning strategies; perceived or suggested immediate improvement strategies and social disputes and their solutions. In support of the above, an analysis of each response made is given in tabular presentation in order to help in visualising the details of the chapter.

#### **4.3. Eviction and its Effect on Social Systems:**

It would be expected that when a community has been forcibly evicted from a familiar environment then much disruption of their social systems and family cohesion would occur. Such was the case with the community who form the basis for this study as will be shown in the ensuing report. The Chyulu community was evicted in 1986 and had to live in makeshift dwellings for five years in towns found on the lower slopes of the

hills. During this time, some family members had to scatter in search of better opportunities. Kalemchwani people were evicted about the same time and had to live in makeshift dwellings along the Nairobi-Mombasa railway. The only people who did not suffer great stress are the Kibwezi community since they were not evicted but were persuaded to leave as soon as the government identified new resettlement areas at Muuni and Masongaleni. This study did not investigate about the life of people in the Masongaleni scheme beyond this point since its focus was Muuni Scheme.

#### **4.3.1. Effects on Social Set-ups and Family Cohesion:**

Asked how their social status and family cohesion was before and after eviction, both men and women (FGD) responded similarly as shown in Table 28. They were all in agreement in stating that before eviction, they lived happily together as family members and relatives mutually assisting one another. This though did not prove entirely true as shown in the triangulation of information by the use of the case studies in chapter 7 of this thesis. As a result of the eviction and subsequent resettling in Muuni, some family members and relatives were dispersed to various places and the mutual cohesion and support systems were affected. However, single subject interviewees originating from Kibwezi said they were not evicted but firmly persuaded to leave and therefore their former social relationships and personal property were not as adversely affected as those of Chyulu and Kalemchwani communities.

#### **4.3.2. Eviction Effects on Personal Household Property:**

As shown in Table 29, all men and women from Chyulu Hills and Kalemchwani involved in FGD said they lost their houses to fire and along with the houses also other household property and foodstuffs. Among other personal properties lost in the eviction pandemonium were water tanks, livestock, furniture and economic loss in court cases. Asked how they incurred economic loss in court cases, one of the women in the FGD had this to say:

*.....the mature adults would run away whenever they saw the eviction force. Helpless small children would be arrested and taken to Machakos where law courts are situated. On realizing their children have been arrested, parents would use their money to travel there in a bid to have back*

*their children and thus face the court and pay  
fines.....*

#### **4.3.3. Eviction Effects on Community Social Amenities:**

Among the community's social amenities lost were, schools, churches, tribal worship sites, and burial places. Discussants from the Chyulu Hills appear to have incurred greater loss than those from Kalembwani as shown in Table 30. Asked where they were burying their dead ones during the transitional period (between eviction and resettling), one of the Chyulu discussants said:

*... ..we would travel by night carrying our dead  
body and bury it when it is still night at the  
Chyulu Hills and before the eviction forces  
are awake and patrolling in the morning we  
would be back in our down-hill makeshift  
dwellings.....*

This is indicative that people suffer a lot when they are forcibly evicted from their familiar place of dwelling in the absence of prior warning system and proper planning of where to resettle them.

#### **4.4. Household Gender Roles and Sharing:**

Under this heading, gender roles are discussed in terms of men's, women's and children's work within households and outside the household. Table 31 shows those roles as they were mentioned by various focus group discussants and single subject respondents.

Men's work include heavy duties mainly such as house construction, bush clearing, livestock herding, charcoal making and transporting and water fetching and transporting although they could also assist in other household duties too. Women's main work included cutting grass and thatching the houses, household chores such as cooking, weeding, fuelwood collection, water fetching and transporting and school communal work. They however also had considerable input into other household and community work such as charcoal making, child-care, group work affiliation, livestock care, casual wage earning, small-scale business, collection and sale of ballast, marketing and midwifery. As for children, mainly they go to school and assist in household duties such as livestock herding, water fetching, and fuelwood collection. They do this only after

school hours, at weekends or during school recessions. There are also other duties children assist in within the household such as child-care, charcoal making, cooking and, as some men said, (possibly in a derogatory connotation) all other duties associated with women. Children who do not go to school for one reason or another would assist their parents in work most appropriate for their gender type. These roles seem to be more elaborate and defined in the areas of origin than in Muuni. Men's and women's roles do not appear to differ much or have such a clear cut line in the Muuni settlement scheme as can be seen in Table 31.

This might help us to understand the importance of division of labour in a well organized system. Once the system is disrupted, it stops to work normally and every one is working haphazardly. This analogy represents the case of Muuni appropriately. The relocation greatly disrupted their house gender roles and sharing.

#### **4.4.1. Inter-Household Food Sharing:**

Food sharing is a social attribute common with people living in difficult environments. In this study sharing of food involves crop and livestock-related foodstuffs as is shown in the ensuing report and Table 32. First, people have to have crop food and livestock before they can share. Table 32 indicates the how people go about sharing in household food support system and that this process is more elaborate in the original settlement areas than in Muuni. Food items such as meat and milk, are very rare in Muuni. Goats for bride price are highly valued in the community for they will determine if one is to have a wife or not. It is important to note that sharing is mutual and most common in time of need. Whereas sharing is considered normal and satisfying in the original settlement areas, it becomes a wishful thinking at Muuni. The following quotes would help to strengthen this statement:

*.....in Chyulu Hills fruits were plenty and free for all at no cost. We enjoyed mutual food sharing in kind and could assist the new comers/settlers with free food to enable them settle down.....*

Chyulu Women FGD

*.....there is no sharing in Muuni because we lack food to share and those who have food demand cash before they can let their food go.....*

Chyulu Women FGD



.....People had plenty in Chyulu Hills. Those who had less food would assist in harvesting work and then would have food in return.....due to scarcity of food, sharing is uncommon here in Muuni.....

Chyulu Men FGD

.....in Kalembwani, we lived as a closed community and we were familiar to one another. This made sharing very common.....here in Muuni, sharing is not much pronounced because not all people are familiar to one another. Sharing exists between familiar friends.....

Kalembwani Women FGD

.....in Kibwezi, food was shared when necessary and during our nzangule (women group) meetings we would contribute food for the needy.....here in Muuni, food is scarce and is not enough for sharing.....

Kibwezi Woman SSI

.....food sharing in Kibwezi was mutual when necessary but here in Muuni sharing is only possible during times of plenty.....

Kibwezi Man SSI

.....in Kalembwani bride price goats were mutually loaned to those who wanted to marry and neighbours with milk would let others have it either free or on cash basis. This would be reciprocated when the situation reversed.....

Kalembwani Men FGD

It is clear from the foregoing that the farm and livestock sharing in the pre-relocation areas was more organized and coordinated than in the new settlement area. These above listed quotes help us appreciate the effects of relocation on social sharing in farm labour and livestock labour. Probably the sharing is initially affected by the alienation caused by the lack of prior acquaintance of the resettlers. But as the time passes, it seems women are the first to initiate cooperation by the formation group organizations.

#### **4.4.2. Farm and Livestock Labour Sharing:**

Farm labour sharing occurred at the time of harvesting and when men's working groups were in force in Chyulu Hills. Chyulu women FGD reported this and also said that in Muuni women shared in assisting expectant mothers in their needs for both midwifery

and house/farm activities. They also said that there was sharing of farm labour with temporary working groups formed in labour peak seasons.

Kalembwani discussants indicated labour sharing in oxen plowing and combine grazing mainly when they were in Kalembwani. There was also the sharing of labour between friends and in working groups in Muuni. As for Kibwezi, sharing of labour was mainly emphasized in men's and women's working groups. Livestock labour sharing was only mentioned by Kalembwani discussants who also said they were tethering their animals in Muuni unlike Kalembwani where they had combine grazing in group or partnership. There were other areas where labour was shared as shown in Table 33. A few quotations are shown below:

*.....in Kalembwani we would combine our livestock either in group or in partnership and contribute money to employ a herdsman to look after them but here in Muuni we share in men and women working groups both in cultivation and in brick making.....*

Kalembwani Men FGD

*.....combine grazing and oxen-plowing was very common in Kalembwani but here in Muuni we mainly tether our livestock and request familiar friends and working groups to assist in mutual farm work.....*

Kalembwani Women FGD

*.....in Kibwezi, we shared in mutual women working groups in farm work, firewood collection, and harvesting. We also merged our flocks and contributed money to pay a herdsman.....only women groups were in force in Muuni because men were very uncaring to form their working groups.*

Kibwezi Woman SSI

*.....in Chyulu we mutually shared in harvesting work, and men's groups shared in bush clearing.....here in Muuni however, there is a low level of women and men group work participation and this is due to fear of inviting working groups in absence of food to feed them.....*

Chyulu Women FGD

Farm and Livestock labour sharing in Kalembwani was more of a group/partnership nature but mainly on livestock labour whereas in Chyulu Hills and

Kibwezi area, it was mainly based on the general farm activities and on rare occasions livestock herding.

#### **4.5. Non-Kamba Resident Ethnic Groups:**

Other non-Kamba ethnic groups were found to live among Kamba people even though they were a minority number. As shown in Table 35, these included Kikuyu, Taita, Embu, Kalejin, Maasai, Nandi, Tanzanian, Luhya, Samburu, Luo, Mijikenda, and Kisii. To arrive at this list, group discussants were asked to list them. The presence of Kikuyu and Taita was mentioned by almost every focus group including single subject interviewees. Individual members of these ethnic groups either bought land from Kamba people, are women married to Kamba men or are workers. Those found in Kibwezi were mainly civil servants.

This information helps us understand that Kamba people are an ethno-tolerant community. It must be understood that some of the relocation, especially the ones associated with ethnic cleansing have a bearing to my study since their triggers is usually based on forced involuntary and unplanned eviction. In fact one of the community (Kalembwani people) studied in this thesis is a victim of ethnic cleansing. It is therefore important to understand how different ethnic groups live and tolerate each other. Furthermore, co-existence is a social resource parameter which can be used to measure the rate of social change for a community undergoing restoration endeavours following a relocation.

##### **4.5.1. Non-Kambas Occupation and Interaction:**

Visual (non-verbal) recording techniques were employed to determine the occupation of non-Kambas. Group discussants were requested to indicate by placing corn seeds in appropriate place in response to the inquiry. Tables 36 and 37 show the results of this PRA as done by the Chyulu and Kalembwani focus groups. Asked how non-Kambas interacted with the Kamba people, the interaction was affirmed as good and mutual regardless of the area of settlement. However, Chyulu women group discussants indicated that although interaction was good, there was a problem of language barrier.

According to the Chyulu men FGD, all non Kambas in Chyulu Hills were basically farmers whereas Chyulu women FGD said that Kikuyus were involved in either farming, business or both. In Muuni, Kikuyus are viewed as basically business people. Table 38 shows how both focus group discussants and single subject respondents categorized the

non-Kamba ethnic groups according to their occupation and interaction. The following are some quotations made by discussants and respondents on this issue:

*.....in Chyulu Hills interaction with non-Kamba was good but language barrier posed a problem.....we taught them our language.....even here in Muuni, interaction with them is good.....*

Chyulu Women FGD

*.....when the workers from Luo land, Taita, and Mijikenda disagreed with their employers, they went to Chyulu Hills, acquired land and continued to intermarry with the Kamba people and interaction continued to be good.....even here in Muuni, interaction with non-Kambas is not bad.....*

Chyulu Men FGD

*.....in Kibwezi, interaction with non-Kamba was good especially during funds raising.....*

Kibwezi Woman SSI

None of the social groups studied in this thesis indicated resentment or (lack of co-operation) with non-Kamba people ethnic groups. However, whereas Chyulu men said that Kikuyu people were basically farmers, their women counterparts said that Kikuyus were both farmers and business-oriented people. This may be understood in the light that some of these non-Kamba ethnic people are women married to Kamba men who themselves are basically farmers. The non-Kamba wives especially if they are Kikuyus or Taitas would have been exposed to business-oriented spirit which is characteristic of their ancestral communities. They therefore might opt to engage in both farming and small-scale (eg. vegetable/fruit) business. . Whereas the Kamba men (their husbands) may view them as basically farmers, other women in the community may view them as business people.

#### **4.6. Agencies Contributing to Community Welfare:**

Several agencies were mentioned in connection with the welfare and good will contributions towards people of not only Muuni but also of the area of previous settlement. In the Chyulu Hills CARE, ACTION AID, and AMREF featured prominently whereas AMREF, the Indian Government, the Catholic church and the Church Province of Kenya (CPK) seem to have an upper hand over others in Muuni according to Chyulu

women and men focus groups. The influence of AMREF and GOK was felt across all settlement areas. Other agencies also played their part in the welfare of people but the magnitude of their influence varied as shown in Table 39a. Some of the agencies helped people just once and then left; others were more consistent and regular in their help while others were contributing negligible help as we shall see when discussing group and single subject responding comments in other Tables related to this topic.

#### **4.6.1. Role of Welfare Agencies According to Chyulu FGD:**

Table 39b. goes into more details of what the Chyulu group discussants said concerning the help they have received from various agencies. Once again, AMREF appears to have contributed across all settlement areas. The Government of Kenya (GOK) also contributed across all settlement areas but apparently people were not satisfied by the amount of famine relief food issued to them. They said the rations were too little to sustain a family even for a single meal, leave alone the erratic and unreliable process of delivery. Some agencies like the Government of India, the Church province of Kenya (CPK) and Member of parliament-guided Non-governmental Organizations (MP-GUIDED NGOs) donated their aid to the community at Muuni just once and then left for good. None of the Chyulu group discussants mentioned either GTZ, Churches in general or Kenya Agricultural Research Institute although these agencies are mentioned by other discussants and respondents as we shall see later.

#### **4.6.2. Role of Welfare Agencies According to Kalemwani FGD:**

Welfare agencies which assisted people both in Kibwezi and Muuni according to Kalemwani FGD included African Medical Research Foundation (AMREF), Catholic Church, Church Province of Kenya (CPK), Government of Kenya (GOK) and MP-guided non-governmental organizations. More agencies gave attention to Muuni than they did in Kalemwani as shown in Table 39c.

There was no difference between settlement areas in the roles these agencies provided. Almost all of them were involved with either food security, health problems or infrastructural development.

#### **4.6.3. Role of Welfare Agencies According Kibwezi SSI:**

Table 39d. reveals an interesting observation according to Kibwezi SSI. Whereas, women indicate that about five agencies came to give help while in Kibwezi---CARE, AMREF, GOI, Catholic Church, Churches in general and GOK, only two agencies--- ACTION AID and GOK were mentioned by men. One of the men even mentioned that they did not need anybody's help while in Kibwezi since they were self-sufficient with their jobs. However, both men and women mentioned several agencies who came for their assistance while in Muuni. Of all the discussants and respondents of the study sample, only one Kibwezi SSI man remembered to mention the role Kenya Agricultural Research Institute (KARI) plays in water provision at Muuni.

The peoples' responses to the relevance of aid agencies indicate that what they need is something greater than just mere peacemeal provision of aid. They in fact need an aid that can help them address their long-term food security, economic and social problems in a more sustainable way.

#### **4.7. Perceived Pre- eviction Planning and Current Improvement Strategies:**

Asked about the pre-planning strategies government should have considered before eviction, both Chyulu and Kalembwani FGD suggested several steps that they perceived to be necessary before eviction could take place. They said the stress would have been less if at least some of those steps had been fulfilled. Several of those suggestions are shown in Table 40. In this topic some of the quotes made by various discussants are highlighted. Furthermore, suggestions of the immediately needed improvement strategies are mentioned and shown in Table 41.

##### **4.7.1. Suggested/Perceived Pre-planning Strategies:**

Based on the summary statements shown in Table 40, ensuing are some of the full quotes made by Chyulu and Kalembwani focus group discussants:

*.....people should have been given prior notice of eviction to avoid the pandemonium that ensued..... before eviction the government should have provided an opportunity for men to come to Muuni first, prepare land and build houses for their families while the women and children were allowed to remain in the Chyulu Hills in the meantime.....water, schools and health centres*

*should have been adequately developed to facilitate for a less stressful transition.....bigger plots should have been allotted.....*

Chyulu Women FGD

*.....government should have found ways and means of preparing at least 5 acres of land for each allotted household and allow people to remain in Chyulu Hills in the meantime people should have been allowed to remain in the Chyulu Hills.....shift notice should have been issued in good time.....water kiosks and schools should have been put in place.....*

Chyulu men FGD

*.....government should have ensured that water and health centres were available before giving us the shift deadline.....*

Kalembwani women FGD

*.....government should have piped water either from river Kibwezi or Makindu and distribute it into Muuni Scheme..... schools for our children should have been put in place before issuing the shift deadline..... transport should have been provided to enable people get to their new settlement in time and with less unduly stress..... ways of giving people some kind loans should have been devised in order to curb the rate of land and livestock sale..... in 1992, people were dying of diseases at the rate of 5 per day and therefore, a hospital or health centre should have been established within Muuni Settlement Scheme or anywhere nearby.....*

Kalembwani men FGD

#### **4.7.2. Suggested/Perceived Immediate Improvement Strategies:**

Asked what they perceived as the immediate improvement requirements, Chyulu and Kalembwani group discussants responded by making suggestions shown in Table 41. It will be noted that water, schools and health centres were the main focal points in discussants' minds among others. Ensuing are some the quotes made by the discussants:

*.....what we need provided urgently is water, schools and health centres.....*

(Chyulu women FGD)

.....our urgent needs are water, primary and secondary schools, and health centres..... as for water, government can tap it from any of the three reliable sources namely Kilimajaro, Omanyi and river Makindu..... furthermore it would really relief us if the government can waive the hospital cost-sharing arrangement..... we also need bursaries for our secondary school children .....the government should provide us with loans.....the 10% land value required of each allotted household should be waived if the government is really committed to our welfare..... (Chyulu men FGD)

.....what we need immediately is water, health centres and cattle plunge dip..... (Kalembwani women FGD)

.....we urgently need water, health centres, equipped and staffed secondary schools and at least a village polytechnic..... people also would like to raise funds for buying water pipes but we have no sources of cash income..... (Kalembwani men FGD)

It can be clearly seen that lack of proper prior planning on the part of the evictors can cause people untold suffering. In fact if people themselves can suggest rightly what the evictors should have done prior to relocation, the evictors should have considered this before initiating the relocation plan. This gives us all a warning and what to expect in future if relocation of people is envisioned.

#### **4.8. Social Disputes and their Solutions:**

Social disputes were mentioned as pertinent to the community under the study. This topic analyses and describes what those social disputes are and how the individuals or the community as whole go about solving them. A detailed tabular presentation as portrayed in Tables 42a. through 42c. will help in having an insight to this topic. It must be noted that as a community, the Kamba people irrespective of their rural settlement location have more or less common and similar disputes. Solutions to those disputes are applied wherever the people are found.

##### **4.8.1. Disputes and Solutions Within Traditional and Contemporary Context:**

Tables 42a. to 42c. highlight the type of disputes commonly experienced and rank the order in which people choose the machinery appropriate for arriving at amicable solutions. Most of the disputes are handled through the government administrative chain



of command which starts from a village elder through (in dire circumstances) to the country's president. Depending on the seriousness of the dispute such as murder and sometimes theft, police and hence law courts may be involved. Some disputes are solved by the party involved without necessarily involving the administrative machinery. Such cases would include some of the intra-household misdemeanor or cases of adultery and sometimes pregnancies that are out of wedlock. Other disputes might be much more complicated and deeply ingrained within Kamba's culture and its animistic practices. Such disputes would include cases where it is really hard to determine the culprit. A good example is an illegal pregnancy case whereby the defendant categorically denies responsibility while the plaintive maintains her charge. In the absence of a witness who would attest beyond any reasonable doubt, the involved parties may want to drop and forget the matter or go ahead and invoke powers of their renowned animistic arbitrator in an oath-taking process (popularly known as *Kithitu* in the local language) to determine who is lying or speaking the truth. According to local beliefs, family members of the one lying and including other members of his/her entire clan and their domestic animals would have to face an eventual but terminal calamity after this process unless a reversing process is initiated on acceptance of liability or lie. Of course, an exorbitant fee for damages and loss including the arbitrator's costs would ensue. Other dispute solving machinery includes clan members especially if the case involves big clan matters such as manslaughter, adultery, matrimonial disunity, parental neglect, drug and alcohol abuse. Disputes calling for employers' arbitration mainly involve family or parental neglect. Where blank spaces appear on the Tables, either the information enquired did not apply to the respondent or respondents lacked relevant experience.

Although none of the discussants and respondents of this study mentioned having gone as high up as office of the president, case(s) are known even in Makueni District itself where the country's president himself had to arbitrate in matters relating to land disputes.

#### **4.9. Conclusions:**

- ◆ The foregoing chapter helps in understanding the disruption of social systems following involuntary and unplanned relocation of the majority of the Muuni community which in turn leads to the following experiences:
- Loss of personal property and community social amenities and infrastructure.

- Loss of customary household gender roles. At Muuni all household family members engage in all sorts of work for survival regardless of sex, in an endeavor to adjust in the new environment.
- Social sharing is mainly pronounced in areas of farm and livestock grazing activities. Other social sharing include areas such as matrimonial obligations and off-farm activities such as group funds raising, firewood and ballast collection. The pre-relocation sharing was more pronounced and elaborate than the post-relocation one.
- Pre- and post-relocation ethno-tolerance is not a problem both in pre- and post-relocation areas. Some of the non-Kamba ethnic groups such as Kikuyu are more business-oriented than other ethnic groups.
- External agencies contribute to the community welfare both in pre- and post-relocation areas. Their impact on the community depends on the frequency and amount of good and services provided. Those agencies which provided goods and services more frequently and in considerable amount, such as African Medical Research Foundation (AMREF), Government of India (GOI) and Government of Kenya (GOK) made an indelible mark in peoples' minds in general and at Muuni settlement scheme in particular.
- Pre-eviction planning as perceived by the study respondents should have been well planned and coordinated especially in provision of water, school and health facilities.
- Social disputes and their solutions are more or less the same regardless of settlement areas. However, disputes regarding trespass of base property such as crop damage by livestock were more prevalent than the others. Solutions to disputes mainly involve government machinery and in some cases animistic intervention.
- Main immediate improvement strategies perceived by Muuni community include urgent need for water provision, education infrastructure and human resource, and equipped and staffed health centres.
- In view of the foregoing conclusions, peoples' production efforts in the process of social and economic change associated with shifts in settlement and landuse patterns in semi-arid areas receive an initial adverse shock due to unplanned and forced relocation. This is a lesson to those who might contemplate a future relocation of human communities within the semi-arid areas of Kenya and possibly elsewhere where similar circumstances apply.

Table 28. Eviction Effects on Social Set-ups and Family Cohesion, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS INQUIRY	CHY		MUN		CHY		MUN		KAL		MUN		KAL		MUN		KIB		MUN		KIB		MUN	
	CHY	MUN	CHY	MUN	CHY	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KAL	MUN
RESPONSES Family and close relative members, -mutually lived together -were dispersed away -mutual assistance cut off -were dispersed within here -were dispersed elsewhere -were not forcibly evicted	x		x				x							x										
Status and effects of eviction on family social cohesion		1																						

Table 29. Eviction Effects on Personal and Household Property, Muuni Settlement Scheme, Makueni District, Kenya, 1997 (FGD).

RESPONDENTS INQUIRY	CHYLU		CHYLU		KLBWNI		KLBWNI	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
RESPONSES -our houses, household properties and foods were razed down -our water tanks were demolished -some of our livestock went astray and got lost in the confusion -the eviction forces were forcibly slaughtering our animals -some of our valuables were stolen by the evictors -our furniture was broken during the eviction pandemonium -we incurred big economic losses in court cases	x	x	x	x	x		x	
Loss of personal property due to eviction								x
Note that people originating from Kibwezi area are not included in this Table because they said: -We were not evicted in hurry like the people of Chyulu and Kalemhwani. We took our time to shift and so did not incur any loss of personal property.								x

Table 30. Eviction Effects on Community Social Amenities, Muuni Settlement Scheme, Makueni District, Kenya, 1997 (FGD).

RESPONDENTS		CHYLU	CHYLU	KLBWNI	KLBWNI
INQUIRY	RESPONSES	WOMEN	MEN	WOMEN	MEN
Loss of community social amenities due to eviction	<p><i>We lost:</i></p> <ul style="list-style-type: none"> <li>-our schools and school records in the fire inferno</li> <li>-our churches and church records in the fire inferno</li> <li>-our tribal sacred animistic worship sites when we moved</li> <li>-our burial sites</li> <li>-one time, our school to fire inferno but was later rebuilt</li> </ul>	x x x x	x x	x	x

Table 31. Household Gender Roles, Muuni Settlement Scheme, Makueni District, Kenya 1997.

RESPONDENTS	RESPONSES	CHY		MUN		KAL		MUN		KAL		MUN		KAL		MUN		KAL		MUN		KAL		
		CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	
Men's work within and without the house	-House construction	x																						
	-Bush clearing	x				x																		
	-livestock herding	x				x																		
	-Charcoal make /Transport	x																						
	-Farm work																							
	-Child care																							
	-Wage casual / family needs																							
	-Water fetching																							
	-Marketing																							
	-Men/Women group work	x																						
Women's work within and without the house	-Cutting grass and thatching	x																						
	-Cooking	x																						
	-Farm cultivation	x																						
	-Fuel wood collection	x																						
	-Water fetching	x																						
	-School communal work	x																						
	-Charcoal making																							
	-Child care																							

Table 31. Cont'd.

RESPONDENTS INQUIRY	CHY		MUN		KAL		KAL		MUN		KAL		KAL		MUN		KIB		MUN		KIB		MUN		
	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	
RESPONSES	-Group work affiliation																								
	-Livestock herding																								
	-Wage casual work																								
	-House work																								
	-Small-scale business																								
	-Collection / sale of ballast																								
	-Milking																								
	-Marketing																								
	-Mid-wife for expectant ♀																								
	-Schooling																								
Children's work within and without the house	-Livestock herding																								
	-Water fetching																								
	-Fuel wood collection																								
	-Farm work																								
	-Miraa harvesting																								
	-Child care																								
	-Charcoal making																								
	-Cooking																								
	-Same work as women																								

Table 32. Inter-Household Food Sharing, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS	CHY			MUN			KAL			MUN			KIB			MUN					
	CHY	MUN	FGD	CHY	MUN	FGD	KAL	MUN	FGD	KAL	MUN	FGD	KIB	MUN	FGD	KIB	MUN	FGD			
Food crop grown and shared inter-households	x																				
	x																				
	x																				
		x																			
				x																	
					x																
Livestock products produced and shared inter-household																					

Table 33. Farm and Livestock Labour sharing, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS	INQUIRY	CHY		MUN		CHY		MUN		KAL		MUN		KIB		MUN		KIB		MUN		
		CHY	MUN	CHY	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KIB	MUN	KIB	MUN	KIB	MUN	KIB	MUN	KIB	MUN	
-Harvesting -Men group work -Pre-natal help by ♀ groups -Temporary ♂ work groups -Oxen plowing -Women work groups -Combine grazing -Tethering -Friends and group help -Labour/Food exchange -Pasture/plowing exchange -Labour /plowing exchange -Own individual labour -No response -Labour hire	Labour sharing	x																				
	Intra- and inter-households	x																				
		x																				
		x																				
		x																				
		x																				
		x																				
		x																				
		x																				
		x																				
		x																				

Table 35. Non-Kamba Resident Ethnic Groups, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS	INQUIRY	CHY		MUN		CHY		MUN		KAL		MUN		KIB		MUN		KIB		MUN		
		CHY	MUN	CHY	MUN	KAL	MUN	KAL	MUN	KAL	MUN	KIB	MUN	KIB	MUN	KIB	MUN	KIB	MUN	KIB	MUN	
Non-Kamba people living within the scheme	Kikuyu	x																				
	Taita	x																				
	Embu	x																				
	Kalenjimi	x																				
	Maasai																					
	Nandi																					
	Tanzanian																					
	Luhya																					
	Samburu																					
	Luo																					
	Mijikenda																					
Kisii																						
No response																						
None																						

Table 36. Occupation of Non-Kamba Ethnic Groups-Chyulu FGD, Muuni Settle Scheme, Makueni District, Kenya, 1997.

Occupation	WOMEN (FGD-PRA)										MEN (FGD-PRA)					
	CHYULU					MUUNI					CHYULU			MUUNI		
	Kikuyu	Kalenjini	Taita	Tanzania	Kikuyu	Taita	Luhya	Luo	Kikuyu	Taita	Mijikenda	Luo	Kikuyu	Taita	Luhya	
Farming	5	1	3	1	3	1	2	4	8	3	2	*	3	1	2	
Business	5	*	2	1	1	*	*	*	*	*	*	*	1	*	*	
Farming & Business	5	*	2	1	1	*	*	*	*	*	*	*	1	*	*	

Table 37. Occupation of Non-Kamba Ethnic Groups-Kalembwani FGD, Muuni, Settlement Scheme, Makueni District, Kenya, 1997.

Occupation	WOMEN (FGD-PRA)										MEN (FGD-PRA)					
	KALEMBWANI					MUUNI					KALEMBWANI			MUUNI		
	Kikuyu	Luo	Luhya	Kisii	Tanzania	Kikuyu	Taita	Luhya	Kikuyu	Luo	Luhya	Kikuyu	Luo	Meru	Kisii	
Farming	3	1	1	1	1	4	1	1	2	1	4	1	1	1	1	
Business	2	*	*	*	*	*	*	*	1	*	1	*	*	*	*	
Farming & Business	2	*	*	*	*	*	*	*	1	*	1	*	*	*	*	



Table 38. Non-Kambas Occupation and Interaction, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS	CIN		EGD		CHY		EGD		KAL		YIGD		KAL		MUN		EGD		KIB		YIGD		KIB		MUN		SN			
	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN		
Occupation of non-Kambas	x																													
			x																											
					x																									
Interaction with Kambas	x																													



Table 39b. Welfare Agencies According to Chyulu FGD, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS		CHYULU WOMEN FGD		CHYULU MEN FGD	
INQUIRY	RESPONSE	CHYULU	MUUNI	CHYULU	MUUNI
Well fare agencies who have ever given aid	CARE	They asked us to form women groups and gave us bucks to upgrade our local animals and also gave us syringes and drugs to inject our animals. In addition they constructed water tanks		They asked us to form groups and provided us with bucks and cockerels to upgrade our local indigenous goats and chicken.. They also assisted in water tank construction	
	ACTION AID	They helped us in building schools for our children		They assisted in school construction and also provided us with. Foodstuff, cooking oil, and maize seeds for planting	
	AMREF	They introduced mobile clinics and we could take our children there for health care	They provided health services and care as well as food	They assisted in digging a water well although water has not yet been struck. Additionally, they assisted in school construction	They provide child health food, assisted in school construction and digging of water well.
	INDIAN		They provided rice, flour, hoes and axes		
	CATHOLIC		They provided hoes, spades, machetes and food		They assisted in constructing two classrooms at Mukameni primary school.
	GTZ				
	CPK				Assisted in constructing water tanks—one at Ilatu and the other at Uvilenti primary schools
	CHURCHES				

Table 39b. Cont'd.

GOK	Gave us famine relief through D.Os and Chief's offices	Provided famine relief but it was not reliable because being inadequate amount and erratic provision	Provided famine relief but it was not reliable because being inadequate amount and erratic provision.. Many people did not even bother to go and collect because it was wasting much time than its worth.	Provided famine relief but it was not reliable because being inadequate amount and erratic provision.. Besides, apart from maize no palsies were provided.
MP-GUIDED NGOS		They assisted in school construction work at Mukameni and Wiviva primary schools		
KARI				
NONE				

Table 39c. Welfare Agencies according to Kalembwani FGD, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS		KALEMBWANI WOMEN FGD		KALEMBWANI MEN FGD	
INQUIRY	RESPONSE	KALEMBWANI	MUUNI	KALEMBWANI	MUUNI
Well fare agencies who have ever given aid	CARE				
	ACTION AID				
	AMREF		<i>They provided child health food</i>		<i>They provided child food and health care services.</i>
	INDIAN				
	CATHOLIC	<i>They provided food and clothes to children and also assisted in school construction. Other churches feared to assist in development projects because they feared temporary nature of settlement.</i>			<i>They assisted in constructing two classrooms at Mukameni primary school.</i>

Table 39c. Cont'd.

GTZ						
CFK						
CHURCHES						
GOK		1	Provided mobile clinics for immunization and also gave us famine relief through D.Os and Chief's offices	Assisted in constructing water tanks—one at Itatu and the other at Uvileni primary schools	Assisted in constructing water tanks—one at Itatu and the other at Mukameni primary schools	
MP-GUIDED NGOS				Provided famine relief but it was not reliable because of being inadequate amount and erratic provision. For example, they would only supply 2 kg of maize per household	provided culverts for casing water well.	Provided famine relief but it was not reliable because being inadequate amount and erratic provision.. Besides, apart from maize no palisies were provided.
KARI				They assisted in school construction work at Mukameni primary school.		They helped us in development projects (unspecified)
NONE						

Table 39d. Welfare Agencies According to Kibwezi SSI, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS		KIBWEZI FGD		KIBWEZI MEN FGD	
INQUIRY	RESPONSE	KIBWEZI	MUUNI	KIBWEZI	MUUNI
Well fare agencies who have ever given aid	CARE	-Assisted in school building (2) -Gave goats to the orphaned (1) -Gave goats to single parents (1)			
	ACTION AID			Provided, -spades (1) -hoes (1)	
	AMREF	-Provided child health food (2) -Provided health care services (2)	In 1994, they provided, - child health food (3) - health care services (2) - bucks, and (1) -Constructed water tank at Wiviva primary school (1)		They provided, -child health food (3) -health care services (1) -farm tools, (1) -demonstrated techniques in, (1) -farm husbandry (1) -animal husbandry (1) and assisted in , (1) -school construction (1)
	INDIAN		Just only once, they provided -rice (2) - flour (2) - clothes (1) -hoes (2) -spade (2) -ax (1)		

Table 39d. Cont'd.

CATHOLIC	-Provided foodstuffs to groups (1) -Provided maize seeds (2)	They provided, -hoes (1) -machete (1) -spade (1)		Provided, -foodstuff (1) -maize (1) -beans (1) -cooking oil once (1) and, -one time promised to provide foodstuff and never did so (1)
GTZ				
CPK		Assisted in constructing water tanks in schools one each at, -Itatu primary school (1) -Uvileni primary school (1)		-Provided foodstuffs (1)
CHURCHES	-New apostolic church provided maize for famine relief (2) -Moslems provided famine relief food and clothes (2)			-Provided spiritual needs (1)
GOK	-Gave us famine relief through D.Os and Chief's offices (3)	-Provided insufficient, unreliable and erratic famine relief maize (3) -Only once, supplied rice (1)	-Provided insufficient famine relief food (about 5 kg) (1) -Supplied famine relief food (1)	-Provided insufficient, unreliable and erratic famine relief maize (3)
MP-GUIDED NGOS				
KARI				-Provided near-by sale water near Itatu shopping centre (1)
NONE		-We were self-sufficient with our jobs	(1)	-Provided near-by sale water piped from river Makindu.



Table 40. Suggested Pre-Eviction Planning Strategies, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

RESPONDENTS		CHYLU		KLBWNI	
INQUIRY	RESPONSES	WOMEN	MEN	WOMEN	MEN
Needed government's pre- eviction planning strategies	<p>The government should have:</p> <ul style="list-style-type: none"> <li>-settled close family members in a common block within the scheme</li> <li>-given prior notice before eviction</li> <li>-arranged for men to move first and open-up the land and later women and children to follow</li> <li>-allocated bigger land plots</li> <li>-developed water kiosks</li> <li>-constructed schools and post teachers</li> <li>-constructed and equip health centres</li> <li>-assisted in opening up at least five acres per household</li> <li>-provided resettlement soft loans to heads of households</li> <li>-deferred eviction until land would have been allocated</li> </ul>	x x x  x x x x x	x     x x x		x     x x x x

Table 41. Suggested/Perceived Immediate Improvement Strategies, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS		CHYLU		KLBWNI	
INQUIRY	RESPONSES	WOMEN	MEN	WOMEN	MEN
Needed immediate improvement efforts in Muuni settlement scheme	<p>1</p> <p>The government should</p> <ul style="list-style-type: none"> <li>-develop water</li> <li>-add more primary schools and build at least one secondary school</li> <li>-build, equip and staff at least one dispensary</li> <li>-provide soft loans</li> <li>-waive the 10% land value settlement fee</li> <li>-provide bursaries for our secondary school children</li> <li>-waive hospital cost-sharing</li> <li>-construct cattle plunge dips</li> <li>-construct, equip and staff at least one village polytechnic</li> <li>-encourage people to adopt the spirit harambee (voluntary funds raising) as a way of cost-sharing</li> </ul>	<p>x</p> <p>x</p> <p>x</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<p>x</p> <p>x</p> <p>x</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>

Table 42a. Disputes/Solutions within Traditional and Contemporary Context, as told by Chyulu FGD, Muuni Settlement Scheme, Makuani District, Kenya 1997.

RESPONDENTS		CHYULU WOMEN FGD		CHYULU MEN FGD	
INQUIRY	RESPONSE	CHYULU	MUUNI	CHYULU	MUUNI
Ranking the order of social disputes solution systems	Property trespass	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Ministry of Agriculture 3 <sup>rd</sup> -Sub-chief	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Selves 3 <sup>rd</sup> -Sub-chief 4 <sup>th</sup> -Chief	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Chief or Police
	Boundaries	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Selves	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Surveyor 3 <sup>rd</sup> -Sub-chief	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Selves or Sub-chief or Chief	1 <sup>st</sup> -Surveyor or Village elder 2 <sup>nd</sup> -Sub-chief
	Land safe	-No land title deeds	1 <sup>st</sup> -Surveyor or Village elder 2 <sup>nd</sup> -Sub-chief	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief or Selves 3 <sup>rd</sup> -Chief or Witness	1 <sup>st</sup> -Clan 2 <sup>nd</sup> -Parents or Village elder 3 <sup>rd</sup> -Sub-chief or Chief
	Theft	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder or Sub-chief	1 <sup>st</sup> -Police or Sub-chief 2 <sup>nd</sup> -Village elder or KANU	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Village elder 3 <sup>rd</sup> -Selves or Sub-chief or Chief	1 <sup>st</sup> -Clan 2 <sup>nd</sup> -Parents or Village elder 3 <sup>rd</sup> -Sub-chief or Chief
	Adultery	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder or Sub-chief	1 <sup>st</sup> -Chief 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Village elder or Selves	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Witness 3 <sup>rd</sup> -Selves	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Oath-taking or Sub-chief or Chief or Witness
	Raping	-Unknown	1 <sup>st</sup> -Doctor 2 <sup>nd</sup> -Police or KANU or Village elder	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor or Witness 3 <sup>rd</sup> -Village elder or Selves	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor 3 <sup>rd</sup> -KANU or Village elder or Sub-chief or Witness or Selves
	Witchcraft	1 <sup>st</sup> -Village elder or Chief wizard 2 <sup>nd</sup> -Sub-chief	1 <sup>st</sup> -Chief wizard 2 <sup>nd</sup> -Village elder or Witch doctor or Sub-chief	1 <sup>st</sup> -Chief wizard 2 <sup>nd</sup> -Witch doctor or Selves 3 <sup>rd</sup> -Village elder or Sub-chief	1 <sup>st</sup> -Chief wizard 2 <sup>nd</sup> -Village elder or Witch doctor or Sub-chief
	Illegitimate pregnancy	-Selves	1 <sup>st</sup> -Oath-taking ( <i>Kithitu</i> ) 2 <sup>nd</sup> -Village elder or Sub-chief or Chief	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan or Village elder 3 <sup>rd</sup> -Sub-chief or Selves	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Village elder or Selves 3 <sup>rd</sup> -Clan or Sub-chief
	Duels and Fights	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief	1 <sup>st</sup> -Village elder or Sub-chief or Selves 2 <sup>nd</sup> -Police or KANU or Doctor 3 <sup>rd</sup> -Community develop. Agent	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor or Witness 3 <sup>rd</sup> -Village elder or Selves	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor or Village elder 3 <sup>rd</sup> -KANU or Sub-chief
	Use of public utilities	-Unknown	1 <sup>st</sup> -Community develop. Agent 2 <sup>nd</sup> -Selves or Chief	1 <sup>st</sup> -Community develop. Agents 2 <sup>nd</sup> -Village elder 3 <sup>rd</sup> -Sub-chief or Chief or Selves	1 <sup>st</sup> -Community develop. Agents 2 <sup>nd</sup> -Sub-chief or Chief 3 <sup>rd</sup> -Village elder or Selves

Table 42a. Cont'd.

Murder/Manslaughter	-Police	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Clan	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Clan 3 <sup>rd</sup> -Witness 4 <sup>th</sup> -Doctor or Village elder or Sub-chief	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Clan 3 <sup>rd</sup> -Doctor 4 <sup>th</sup> -Witness
Attempted suicide	-Unknown	1 <sup>st</sup> -Doctor 2 <sup>nd</sup> -Police	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor or Witness 3 <sup>rd</sup> -Village elder or Sub-chief	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor or Witness
Matrimonial disunity	-Parents or Selves	1 <sup>st</sup> -Clan 2 <sup>nd</sup> -Selves	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan 3 <sup>rd</sup> -Selves	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan 3 <sup>rd</sup> -Selves
Parental neglect	-Parents are self-sufficient	1 <sup>st</sup> -Clan or Employer 2 <sup>nd</sup> -Parents 3 <sup>rd</sup> -Sub-chief or Chief	-Parents are self-sufficient	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan or Village elder 3 <sup>rd</sup> -Sub-chief or employer or Police
Drug /Alcohol abuse	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Clan	1 <sup>st</sup> -Clan 2 <sup>nd</sup> -Parents or Police	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Village elder or Sub-chief 3 <sup>rd</sup> -Doctor 4 <sup>th</sup> -Selves	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Parents or Clan or Village elder 3 <sup>rd</sup> -Chief

Table 42b. Disputes/Solutions within Traditional and Contemporary Context as told by Kalemchwani FGD, Muuni Settlement Scheme, Makueni District, Kenya 1997.

RESPONDENTS		KALEMBWANI WOMEN FGD		KALEMBWANI MEN FGD	
INQUIRY	RESPONSE	KALEMBWANI	MUUNI	KALEMBWANI	MUUNI
Ranking the order of social disputes solution systems	Property trespass	1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Village elder	1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Village elder	-Not Applicable. Land was communally owned by Maasai	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Police
	Boundaries	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Chief 3 <sup>rd</sup> -Surveyor or Sub-chief	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Chief 3 <sup>rd</sup> -Surveyor or Sub-chief	-Not Applicable. Land was communally owned by Maasai	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Surveyor or Chief
	Land sale	-Police or Clan or Sub-chief or Chief	-Police or Clan or Sub-chief or Chief	-Not Applicable. Land was communally owned by Maasai	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Clan 3 <sup>rd</sup> -Sub-chief 4 <sup>th</sup> -Police
	Theft	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Sub-chief	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Sub-chief	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Village elder	1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Village elder
	Adultery	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Police 3 <sup>rd</sup> -Village elder or Sub-chief 4 <sup>th</sup> -Chief wizard	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Police 3 <sup>rd</sup> -Village elder or Sub-chief 4 <sup>th</sup> -Chief wizard	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Parents 3 <sup>rd</sup> -Clan	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Parents 3 <sup>rd</sup> -Clan
	Raping	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Oath-taking or Doctor	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Oath-taking or Doctor	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Witness 3 <sup>rd</sup> -Parents or Doctor	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Witness 3 <sup>rd</sup> -Parents or Doctor
	Witchcraft	1 <sup>st</sup> -Chief wizard 2 <sup>nd</sup> -KANU or Village elder or Witch doctor	1 <sup>st</sup> -Chief wizard 2 <sup>nd</sup> -KANU or Village elder or Witch doctor	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Witch doctor 3 <sup>rd</sup> -Village elder or Sub-chief	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Witch doctor 3 <sup>rd</sup> -Village elder or Sub-chief
	Illegitimate pregnancy	1 <sup>st</sup> -Parents or Clan 2 <sup>nd</sup> -Oath-taking or Village elder	1 <sup>st</sup> -Parents or Clan 2 <sup>nd</sup> -Oath-taking or Village elder	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan 3 <sup>rd</sup> -Oath-taking 4 <sup>th</sup> -Police	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan 3 <sup>rd</sup> -Oath-taking 4 <sup>th</sup> -Police
	Duels and Fights	1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Selves	1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Selves	1 <sup>st</sup> -Police or Selves 2 <sup>nd</sup> -Doctor or Witness	1 <sup>st</sup> -Police or Selves 2 <sup>nd</sup> -Doctor or Witness
	Use of public utilities	1 <sup>st</sup> -Community develop. Agent or Village elder 2 <sup>nd</sup> -Sub-chief	1 <sup>st</sup> -Community develop. Agent or Village elder 2 <sup>nd</sup> -Sub-chief	-Not applicable. No registered groups	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Community develop. Agent

Table 42b. Cont'd.

	Murder/Manslaughter	-Police	-Police	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Clan	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Clan
	Attempted suicide	-Police or Doctor	-Police or Doctor	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor 3 <sup>rd</sup> -Witness	1 <sup>st</sup> -Police 2 <sup>nd</sup> -Doctor 3 <sup>rd</sup> -Witness
	Matrimonial disunity	1 <sup>st</sup> -Clan 2 <sup>nd</sup> -Parents	1 <sup>st</sup> -Clan 2 <sup>nd</sup> -Parents	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Parents 3 <sup>rd</sup> -Clan 4 <sup>th</sup> -Church	1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Parents 3 <sup>rd</sup> -Clan 4 <sup>th</sup> -Church
	Parental neglect	1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Village elder or employer	1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Village elder or employer	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan or Employer 3 <sup>rd</sup> -Police or Witch doctor	1 <sup>st</sup> -Parents 2 <sup>nd</sup> -Clan or Employer 3 <sup>rd</sup> -Police or Witch doctor
	Drug/Alcohol abuse	-Parents	-Parents	1 <sup>st</sup> -Clan or Village elder 2 <sup>nd</sup> -Police 3 <sup>rd</sup> -Parents or Witch doctor	1 <sup>st</sup> -Clan or Village elder 2 <sup>nd</sup> -Police 3 <sup>rd</sup> -Parents or Witch doctor

Table 42c. Disputes/Solutions Within Traditional and Contemporary Context as told by Kibwezi SSI, Muuni Settlement Scheme, Makeni District, Kenya 1997.

RESPONDENTS		KIBWEZI WOMEN FGD			KIBWEZI MEN FGD		
INQUIRY	RESPONSE	KIBWEZI	MUUNI	KIBWEZI	MUUNI		
Ranking the order of social disputes solution systems	Property trespass	♀1: 1 <sup>st</sup> -D.O. 2 <sup>nd</sup> -Chief 3 <sup>rd</sup> -Sub-chief ♀2: 1 <sup>st</sup> -Police 2 <sup>nd</sup> -Selves 3 <sup>rd</sup> -Min of Agriculture ♀3: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Ministry of Agriculture	♀1: -Was never taken serious ♀2: -Police ♀3: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Chief 3 <sup>rd</sup> -Min of Agriculture	♀1: -Village elder ♀2: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder ♀3: 1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Chief 4 <sup>th</sup> -Police	♀1: -Village elder ♀2: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder ♀3: 1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Chief 4 <sup>th</sup> -Police		
	Boundaries	♀1: -Not applicable ♀2: -No response ♀3: -Not applicable	♀1: 1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief ♀2: 1 <sup>st</sup> -Village elder 2 <sup>nd</sup> -Sub-chief 3 <sup>rd</sup> -Chief 4 <sup>th</sup> -Police ♀3: -	♀1: -Not a problem ♀2: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder 3 <sup>rd</sup> -Sub-chief 4 <sup>th</sup> -Chief 5 <sup>th</sup> -Surveyor ♀3: -Chief	♀1: -Village elder ♀2: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder 3 <sup>rd</sup> -Sub-chief 4 <sup>th</sup> -Chief 5 <sup>th</sup> -Surveyor ♀3: -		
	Land sale	♀1: -Unheard of ♀2: -Village elder but rare ♀3: -Not applicable	♀1: 1 <sup>st</sup> -Chief 2 <sup>nd</sup> -Sub-chief ♀2: - Village elder upward ♀3: -	♀1: -Unheard of ♀2: 1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Chief ♀3: -	♀1: -Village elder /committee ♀2: 1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Chief (avoid court) ♀3: -Surveyor		
	Theft	♀1: -Unheard of ♀2: -Police ♀3: 1 <sup>st</sup> -Police 2 <sup>nd</sup> -D.O.	♀1: -Village elder ♀2: -Police ♀3: 1 <sup>st</sup> -Police 2 <sup>nd</sup> -KANU	♀1: -KANU ♀2: -Police 3 <sup>rd</sup> -Chief (avoid V. elder) ♀3: -Unheard of	♀1: - ♀2: - ♀3: 1 <sup>st</sup> -Sub-chief 2 <sup>nd</sup> -Police		
	Adultery	♀1: -Unheard of ♀2: -Village elder but rare ♀3: -Unheard of	♀1: -No comment ♀2: -Village elder ♀3: -Unheard of	♀1: -Unheard of ♀2: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder ♀3: -Unheard of	♀1: -Unheard of ♀2: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Village elder ♀3: 1 <sup>st</sup> -Selves 2 <sup>nd</sup> -Parents 3 <sup>rd</sup> -Clan 4 <sup>th</sup> -Sub-chief		
	Raping	♀1: -Uncommon ♀2: -Unheard of ♀3: -Unheard of	♀1: -Village elder ♀2: -Police ♀3: -Unheard of	♀1: -Unheard of ♀2: -Unheard of ♀3: -Police	♀1: -Unheard of ♀2: 1 <sup>st</sup> -Police ♀3: 2 <sup>nd</sup> -Police 3 <sup>rd</sup> -Church		

Table 42c. Cont'd.

Witchcraft	<p>¶1: ¶2: ¶3:</p>				
Illegitimate pregnancy	<p>¶1: ¶2: ¶3:</p>	<p>Fear of youth suicide -Parents -Unheard of</p>	<p>¶1: ¶2: ¶3:</p>	<p>-Fear of youth suicide -Parents -Unheard of</p>	<p>¶1: ¶2: ¶3:</p>
Duels and Fights	<p>¶1: ¶2: ¶3:</p>	<p>-Fear of youth suicide -Parents -Rare problem</p>	<p>¶1: ¶2: ¶3:</p>	<p>-Fear of youth suicide -Parents -Unheard of</p>	<p>¶1: ¶2: ¶3:</p>
Use of public utilities	<p>¶1: ¶2: ¶3:</p>				
Murder/Manslaughter	<p>¶1: ¶2: ¶3:</p>				
Attempted suicide	<p>¶1: ¶2: ¶3:</p>				
Matrimonial disunity	<p>¶1: ¶2: ¶3:</p>				
Parental neglect	<p>¶1: ¶2: ¶3:</p>				
Drug/Alcohol abuse	<p>¶1: ¶2: ¶3:</p>				



## **CHAPTER 5. FOOD SECURITY STRATEGY**

### **5.1. Introduction:**

The main justification for this chapter is to address my objective of determining the factors affecting and the importance of food security status of households as a result of the adjustment process.

As many food security authorities shown in chapter two of this thesis advocate, food security is the priority concern of humanity anywhere and several ideas in the area of research and education on food production, storage, access and distribution are explored in order to ensure reliable and sustainable food availability both in quality and quantity on a long term basis. In fact Eicher (1986) defines food security as the ability of a country or region to ensure, on a long term basis, that its food system provides the total population access to a timely, reliable and nutritionally adequate supply of food. Other authors who have defined food security more or less like Eicher include Sarris (1985), Agarwal (1992) and Clark (1991). In this chapter, we see how the study respondents replied concerning systems and opportunities to sustain or support their food security systems. The chapter touches on the types and sources of common foodstuffs, ranking of the commonly eaten food stuffs and dishes, cultural and social taboos associated with foodstuffs and seasonal and drought food security strategies. Further, an analysis and description is given on how small-scale business, family members and other social networks contribute to food security. Additionally, non-traditional food production practices as a means of improving food security is analyzed and described. Finally, the role played by governments and other welfare agencies either directly by putting foodstuffs in peoples' kitchens or indirectly through food security promotional ideas is be given.

### **5.2. Food Security Strategies Adopted by Muuni People Within their Cultural Production Practices and Contemporary Kenya:**

Broadly speaking, there are two main strategies adopted by the Kamba people to cater for their food security. One of them is land tillage practices and the planting of different types of food grains and pulses. The other is livestock keeping and its use as a source of food. Hence, Kamba people are traditionally referred to as agro-pastoralists. However, in contemporary Kenya, other strategies are employed by Kamba people to supplement their farm production. In view of increasing population pressure land allocation per household gets less and less. Moreover, drought has worsened and adversely affected farm production. As a result, more and more people search for wage

employment in order to buy food imported from other areas. Furthermore, almost all households need external famine food relief such as the ones offered by World Food Programs (WFP)(Sugden, 1995), Government food relief programs and direct or indirect NGO famine relief interventions. In the course of this study, the government was issuing famine relief food to this community but my efforts to obtain records failed due to sensitive issues involved in this activity (Nation Correspondent, 1999). This chapter reports how Muuni people responded to inquiries related to food security strategies adopted in pre-and post relocation eras.

### **5.2.1. Types and Sources of Common Foodstuffs:**

Common foodstuffs produced and eaten by Kamba people are crop- and livestock-related. Crop-related types include cultivated and wild species while animal-related types include domesticated and game animals. Wild related plant species and game meat are only used when prevailing circumstances such as drought and economic hardship force people to use them. However, unless it is a matter of life and death, (Nation Correspondent, 1999), these sources are not viewed as important contributors to food security.

### **5.2.2. Common Cultivated Crop Foodstuffs:**

The types of food cultivated and eaten by Kamba people are highlighted in Table 43. It is important to note that traditionally, Kamba people grow more or less the same type of food crops regardless of location. On top of the list is maize, beans, cowpeas, green grams and pigeon peas. In the Chyulu Hills, fruits and green vegetables appear to have a considerable input to the list of foodstuffs grown there. Some Kibwezi men SSI indicated that they often sold their livestock in order to buy crop food stuffs. Only in the Chyulu Hills where crops like carrots, groundnuts, Irish potatoes, mangoes, sugarcane and arrowroots were said to be grown.

### **5.2.3. Common Livestock-related Foodstuffs:**

Domesticated livestock kept by Kamba people include cattle, goat, sheep, and chicken mainly. Livestock food products are displayed in Table 44. Although meat and milk were regarded as essential foodstuffs their use was not common especially in Muuni given the livestock reduction in numbers as a result of lack of adequate forage and water. It was only on special occasions that animals were slaughtered for meat. However,

chickens were slaughtered more frequently than other livestock. In some cases sick and dead animals would be slaughtered for meat. Otherwise, most of the meat eaten is either bought from butcheries or come from game animals. The Kalembwani and Chyulu Hills areas appear to produce more livestock food products than the Muuni area given the fact that their forage and water bases were not as limiting as those of the latter.

#### **5.2.4. Common Wild Vegetables:**

In times of hardship, dependent on the area of settlement, Kamba people have a variety of wild vegetables that they can make use of as shown in Table 45. Most common of all are what is locally known as *Kikoe* (*Anailema johnstonii*), *Kiwia*, and *Mukauwu*. Those vegetables appear to be more common in the Chyulu Hills than anywhere else, an indication that these vegetables are soil moisture dependent.

#### **5.2.5. Common Wild Fruits:**

Quite a variety of wild fruits were mentioned as shown in Table 46. Among them, *Ndula* (*Rhus vulgaris*), *nduva* (*Grewia similis*), *Ngaaka* (*Premna oligotricha*), *Nzovi* (*Hoslundia opposith*), *Mbu* (*Grewia villosa*), *Maua*, *Ngomoa* (*Vangueria acutiloba*), *Ngukuma* and *Namba* (*Adansonia digitata*—Eng., Baobab) appear to be more prominent as they were mentioned to grow almost across all settlement areas. Some of the fruits seem to be area-specific. For example, *Nthambalau*, *Ngalawa* (*Grewia bicolor*), *Nthumula* (*Albizia amara*), *Ngangakanyo*, *Nzaaya*, *Ngathu* and *Mbisavisi* (*Lantana trifolia*) seem to be mentioned only by respondents originating from Kibwezi. Once again, the Chyulu Hills appear to have more of those wild fruit varieties.





Table 45. Types and Sources of Common Wild-Related Vegetables, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

INQUIRY	CHY		MUN		KAL		KGD		MUN		KAL		KGD		MUN		KIB		SSJ		MUN		KIB		SSJ					
	CHY	MUN	CHY	MUN	KAL	MUN	KGD	MUN	KAL	MUN	KGD	MUN	KAL	MUN	KGD	MUN	KAL	MUN	KIB	MUN	KIB	MUN	KIB	MUN	KIB	MUN				
Common wild-related vegetables (given in Kamba names and a few in botanical names too).		x		x								x																		
	- <u>likowe</u> ( <u>Anailema johnstonii</u> )	x		x								x																		
	- <u>musiya</u>	x																												
	- <u>matulu</u> ( <u>Solanum nigrum</u> )	x																												
	- <u>kwia</u>	x																												
	- <u>kitungi</u>	x																												
	- <u>umwii</u>	x																												
	- <u>walange</u>	x																												
	- <u>mukawu</u>	x																												
	- <u>mathookwe</u> ( <u>Vigna membranacea</u> )	x																												
	- <u>uthunga</u> ( <u>Sonchus oleraceus</u> )	x																												
	- <u>musangiki</u>	x																												
	- <u>kimowe</u>	x																												
	- <u>ukeea</u>	x																												
	- <u>mukuluto</u>	x																												
	- <u>uthui</u> ( <u>Neonotonia wightii</u> ; Eng., Glycine)																													
	- <u>ndulu</u> (Eng. Chili)																													
- <u>mchicha</u>																														
- <u>uswaka</u>																														
- <u>ngarwu</u>																														
- <u>kutu-kwa-nzia</u>																														
- <u>miraa</u> ( <u>Caritha edulis</u> )																														
- <u>Amaranthus</u>	x																													

Table 46. Types and Sources of Common Wild-related Fruits, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS	CHIY		KAL		EGD		KIB		SSJ		MUN	
	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN
Common wild-related fruits (given in Kamba names and a few in botanical names too).		x	x	x	x	x	x	x	x	x	x	x
	-ndala ( <i>Rhus vulgaris</i> )	x										
	-matuyu ( <i>Ficus capensis</i> )	x										
	-ndumbuu	x										
	-muthu	x										
	-nduva ( <i>Grewia similis</i> )	x										
	-ngaakaa ( <i>Premna oligotricha</i> )	x										
	-nzovi ( <i>Hoslundia oppositifolia</i> )	x										
	-ngolesya	x										
	-mba	x										
	-mbu ( <i>Grewia villosa</i> )	x										
	-nzoonu	x										
	-ngaatu ( <i>Cyperus bulbosus</i> ; Eng., sedges)	x										
	-matoo ( <i>Dombeya rotundifolia</i> )	x										
	-maua	x										
	-ngomaa ( <i>Vangueria acutiloba</i> )	x										
-ndae	x											
-mbelengwa												
-ndului ( <i>Balanites aegyptiaca</i> )												
-nithi												
-ngawa												
-ngakwa												
-ngukuma												
-ngwasu ( <i>Albizia amara</i> )												

Table 46. Cont'd.

RESPONDENTS INQUIRY	CHY		FGD		CHY		FGD		KAL		FGD		KIB		SSI	
	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY
-namba ( <i>Adansonia digitata</i> ; Eng, baobab)	x								x							
-ngumuti ( <i>Gardenia jovis-ionantis</i> )																
-muthia (Cordia gharaf)																
-nithambalau																
-ngalawa ( <i>Grewia bicolor</i> )																
-nithumula																
( <i>Albizia amara</i> )																
-ngangakanyo																
-nzaaya																
-ngathu (carrot-like)																
-mbisavisi ( <i>Lantana trifolia</i> )																



### **5.2.6. Common Wild Edible Roots:**

A few discussants mentioned some wild roots that were either used as food or medicine. Most of them were mentioned by people who had originated from Kalembwani especially men FGD. None of the Kibwezi SSI mentioned use of wild roots whereas only one type of wild roots was mentioned by the Chyulu men FGD as portrayed in Table 47. As medicine and food, roots would be boiled in water and then the water would be allowed to cool down and drunk either directly or mixed with animal bone soup. In some instances, roots would be eaten or chewed raw and directly.

### **5.2.7. Common Wild (game) Meats:**

Although it is illegal to hunt game animals in Kenya for food without valid government license, game animals are usually hunted or trapped for meat as shown in Table 48. Caution has to be taken when hunting or trapping since illegal hunters are liable to prosecution and receive fines or imprisonment terms or both if found guilty. Whereas both the Chyulu and Kalembwani Men FGD felt more free to discuss game meat issue, women, especially those originating from Kalembwani were more reserved. Game meat included both mammals and birds. Dik-dik was the main game meat mentioned and eaten in all settlement areas. Monkeys are also eaten but not by all the people. Game meat is sometimes exchanged with food grain or sold for cash though at a reduced price. Although the majority said they would not eat monkey meat, by accepting to exchange grain or cash for game meat, people could not be sure of its source and quality.

### **5.3. Perceived Priority Food Stuffs and Dishes:**

What study respondents valued as their priority foodstuffs was put in a ranking order starting from the most important to the least important of five crops (Table 49 and 50.) Ranking indicated what Muuni farmers considered their priority foods in alleviating famine. Householders would struggle to ensure the availability of planting seeds of the priority food varieties before the rains start because failure to do so would threaten his food security plan.

Table 47. Types and Sources of Common Wild-related Roots, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS INQUIRY	RESPONSES	CHY			MUN			EGD			KAL			MUN			EGD			KIB			SSJ			MUN			
		CHY	MUN	EGD	CHY	MUN	EGD	KAL	MUN	EGD	KAL	MUN	EGD	KIB	MUN	EGD	KIB	MUN	EGD	KIB	MUN	EGD	KIB	MUN	EGD	KIB	MUN		
Common edible wild-related roots (given in Kamba names)	- <i>maseembe</i>																												
	- <i>ngosikosi</i>																												
	- <i>ngaatu</i>																												
	- <i>ngalawa</i>																												

Table 48. Types and Sources of Common Wild (game)-related Meat Animals, Muuni Settlement Scheme, Makueni District Kenya, 1997.

RESPONDENTS INQUIRY	RESPONSES	CHY			MUN			EGD			KAL			MUN			EGD			KIB			SSJ			MUN				
		CHY	MUN	EGD	CHY	MUN	EGD	KAL	MUN	EGD	KAL	MUN	EGD	KIB	MUN	EGD	KIB	MUN	EGD	KIB	MUN	EGD	KIB	MUN	EGD	KIB	MUN			
Common wild (game)-related meats (given mainly in English names)	- <i>n/hozia</i>	x																												
	-dik-dik	x																												
	-meat/cash/grain exchange	x																												
	-bush pig	x																												
	-warthog	x																												
	-antelopes	x																												
	-squirrel	x																												
	-monkey	x																												
	-buffalo	x																												
	-giraffe	x																												
	-eland	x																												
	-wildebeest	x																												
	-antbear	x																												
	-hare	x																												
	-porcupine	x																												
	-ostrich	x																												
	-guinea fowl	x																												
	-pheasant	x																												
	-birds	x																												
	-zebra	x																												
-gazelle	x																													
-eaten when available																														
-fear of arrest by authority																														
-monkey not eaten by all																														
-not interested																														

This ranking does not by any means indicate that other foods are not important. In fact, although some of them might not have been mentioned my experience is that they play a very important role especially in dry seasons. Examples include sorghum, cassava, sweet potatoes, pumpkins finger millet, bulrush millet etc. There are several dishes people could prepare from the same foodstuffs.

### **5.3.1. Ranking Commonly Eaten Foodstuffs:**

Table 49 shows how study respondents ranked food stuffs commonly eaten from the most to least commonly eaten. There was some variation in this ranking depending on origin. For instance, Chyulu women FGD ranked the first five Chyulu Hills food stuffs as maize-bean-pigeon peas-black beans-sweet potatoes. On the other hand, the order of ranking for Muuni is maize-cowpeas-green grams-sorghum-finger millet. This can be understood at Muuni more drought-tolerant would be grown whereas in the Chyulu Hills, reliable weather conditions would favour high rainfall crops. The Chyulu men and women FGD differed slightly on their ranking for Chyulu and Muuni foodstuffs. Likewise, there were variations in foodstuffs ranking between Kalembwani men and women FGD.

What is worth noting however is the fact that whereas maize ranks first in all cases, beans, cowpeas, green grams, pigeon peas, sorghum and finger millets are often found between second and fifth ranking. This gives these crops an important place in the dietary habits of the people. As far as livestock food products were concerned, milk ranked first and meat second in all cases. As for Muuni, these products were said to be rare. Muuni women FGD mentioned that Muuni people were even feeding on dead livestock whereas, Kalembwani women said even in Kalembwani area, people preferred sale over slaughter and part of the money would be used for buying meat from a butcher whereas other portion would be used to meet some other basic household needs.

Table 49. Commonly eaten foodstuffs ranked from most to least commonly eaten, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS		CHYUL. WOMEN		CHYUL. MEN		KALEM. WOMEN		KALEM. MEN		
INQUIRY	RESPONSE	CHYUL.	MUUNI	CHYUL.	MUUNI	KALEM.	MUUNI	KALEM.	MUUNI	
Food stuffs ranked from the most commonly eaten to the least eaten.	-Maize	1 <sup>st</sup>	1 <sup>st</sup>	1 <sup>st</sup>	1 <sup>st</sup>	1 <sup>st</sup>	1 <sup>st</sup>	1 <sup>st</sup>	1 <sup>st</sup>	
	-Bean	2 <sup>nd</sup>		2 <sup>nd</sup>			2 <sup>nd</sup>	2 <sup>nd</sup>		
	-Pigeon pea	3 <sup>rd</sup>		3 <sup>rd</sup>			3 <sup>rd</sup>	3 <sup>rd</sup>		
	-Black bean	4 <sup>th</sup>		4 <sup>th</sup>			4 <sup>th</sup>	4 <sup>th</sup>		
	-Sweet potato	5 <sup>th</sup>		5 <sup>th</sup>			5 <sup>th</sup>			
	-Pumpkin	6 <sup>th</sup>		6 <sup>th</sup>			6 <sup>th</sup>			
	-Cassava	7 <sup>th</sup>		7 <sup>th</sup>			7 <sup>th</sup>			
	-Finger millet	8 <sup>th</sup>		8 <sup>th</sup>			8 <sup>th</sup>			
	-Banana	9 <sup>th</sup>	5 <sup>th</sup>	1 <sup>st</sup>	9 <sup>th</sup>		5 <sup>th</sup>			
	-Sorghum	10 <sup>th</sup>	4 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>		4 <sup>th</sup>		3 <sup>rd</sup>	
	-Cow pea		2 <sup>nd</sup>				2 <sup>nd</sup>		2 <sup>nd</sup>	
	-Green gram		3 <sup>rd</sup>				3 <sup>rd</sup>		5 <sup>th</sup>	
	-Irish potato						4 <sup>th</sup>			
	-Gourds				10 <sup>th</sup>					
	-Giant bean		1 <sup>st</sup>	1 <sup>st</sup> (rare)						
-Milk		2 <sup>nd</sup>	2 <sup>nd</sup> (rare)			1 <sup>st</sup>	1 <sup>st</sup> (rare)			
-Meat			(dead animal)			2 <sup>nd</sup>	2 <sup>nd</sup> (rare)			
	-none for milk/meat					(sale prefer)				
	NB.									
	-Not inquired for kibwezi (see cultural change)									

### 5.3.2. Ranking Common Kamba Dishes:

In view of the fact that one of the study's objectives is that is understanding changes in the role of livestock in the subsistence pattern and its contribution to household income and food security in relation to crop production and off-farm activities, it is necessary to analyze and rank the common Kamba dishes and their importance in relation to Muuni situation.

Several different dishes could be prepared from the same type of food as shown in Table 50. For example, from maize grains, five different dishes were mentioned and ranked by different focus groups. Chyulu women FGD ranked those dishes as 1<sup>st</sup>: *Kitheri* (cooked maize+pulses); 2<sup>nd</sup>: *Ngima* (cooked maize flour dough); 3<sup>rd</sup>: *Ussu* (gruel); 4<sup>th</sup>: *Muthokoi*(cooked deshelled maize) and; 5<sup>th</sup>: *musenga* (cooked crushed maize). Other groups may differ slightly in the ranking of maize dishes but might also add some more dishes to the list. For example, Chyulu men FGD added roast maize, boiled maize and *Kinaa* (raw maize dough) to the list. The rankings of other dishes made from a variety of food crops are also shown in Table 50. Maize and cassava had the longest list of dishes.

Livestock-related dishes for milk included fresh milk; sour milk; tea; and; ghee. Meat dishes included stewed, roast and boiled meat. The ranking of milk dishes indicated that tea was the most popular drink made from milk whereas among meat dishes, stew appears to be the most popular. It must be noted that although these dishes were mentioned, not all of them were prepared by the householders. In fact most of them would only be prepared in times of good harvests. Under Muuni situation, the livestock related dishes were very uncommon given the fact that their livestock numbers had dwindled as a result of the shift The only little mainly goat milk that was available from time to time was used for making tea. By far however, crop-related dishes overshadowed milk-related ones especially in Muuni settlement scheme.

### 5.4. Food Cultural Taboos:

One of the study objectives is to determine the food security status of households as a result of the adjustment process. Along with house food security is the deeply ingrained cultural food taboos probably designed to deny some family members prime food stuff while favouring others. It is important to understand these taboos and how they work if in order to help educate people to adjust accordingly and reduce gap of gender inequality.

Most of social and cultural food taboos among Kamba people are mainly associated with the livestock meat as can be seen in Table 51. The taboos are usually about gender, age and matrimonial dietary beliefs and habits on who should or should not eat various parts and cuts of meat. Some of the taboos are no longer being taken serious and people are free to break them unless one is very conservative. Food crop related social taboos are not many and likewise they are not always strictly observed.



Table 50. Cont'd.		Gourds			1 <sup>st</sup> -boil 2 <sup>nd</sup> -mash 3 <sup>rd</sup> -stew		1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew	1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -deshelled mz	1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -deshelled mz	1 <sup>st</sup> -boil 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -roast				
Banana		1 <sup>st</sup> -ripe 2 <sup>nd</sup> -boil 3 <sup>rd</sup> -mash												
Cow pea		1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -deshelled mz 4 <sup>th</sup> -mash	1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+cp 3 <sup>rd</sup> -mash				1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew	1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -deshelled mz	1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -deshelled mz	1 <sup>st</sup> -boil 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -roast				1 <sup>st</sup> -mz+cowpea 2 <sup>nd</sup> -stew -deshelled mz
Green gram		1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+egg	1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+egg				1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+egg	1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+egg	1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+egg	1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+egg				1 <sup>st</sup> -stew 2 <sup>nd</sup> -mz+egg
Black bean		1 <sup>st</sup> -black bn+mz 2 <sup>nd</sup> -stew												1 <sup>st</sup> -black bn+mz 2 <sup>nd</sup> -stew
Giant bean														1 <sup>st</sup> -giant bn+mz 2 <sup>nd</sup> -stew
Milk					1 <sup>st</sup> -sour 2 <sup>nd</sup> -tea 3 <sup>rd</sup> -ghee 4 <sup>th</sup> -flesh drink		1 <sup>st</sup> -tea 2 <sup>nd</sup> -sour		-tea	1 <sup>st</sup> -tea 2 <sup>nd</sup> -sour 3 <sup>rd</sup> -flesh drink 4 <sup>th</sup> -ghee				1 <sup>st</sup> -tea 2 <sup>nd</sup> -sour 3 <sup>rd</sup> -flesh drink 4 <sup>th</sup> -ghee
Meat					1 <sup>st</sup> -roast -stew 2 <sup>nd</sup> -boil		1 <sup>st</sup> -stew 2 <sup>nd</sup> -roast			1 <sup>st</sup> -stew 2 <sup>nd</sup> -roast 3 <sup>rd</sup> -boil				1 <sup>st</sup> -boil 2 <sup>nd</sup> -stew 3 <sup>rd</sup> -roast
-none for milk/meat		x												
NB. -Not inquired for kibwezi (see cultural change)														



#### 5.4.1. Animal-Related Food Socio-Cultural Taboos:

Table 51 shows how men and women FGD and SSI responded to an inquiry about food taboos. What was perceived by many as very important was head meat. Almost every group and single subject interview remembered to mention the fact that head meat is meant for men and not women. A few quotes may serve to elaborate this:

*.....head meat is strictly for men and is entirely their prerogative to give or not to give women after they have had enough themselves.....this is so because men are the ones who handle and bury dead human bodies.*

*.....tongue meat is meant for men but I think men are being selfish.....women may eat tongue meat in a public commercial butchery because social and cultural taboos should not be tied with commercial business.*

*.....if a goat is slaughtered in absence of a husband, the head meat must be eaten by neighbouring men and this taboo must apply to game animals' meat too.*

Chyulu women FGD

*.....head meat and lungs are for men and it is at their discretion to give or not to give to women.....this is because they are the ones who dig graves to bury dead human bodies.*

*.....Testicles are old men's delicacy while the hump meat is given to young men*

*.....women are allowed to eat shank meat, backbone meat and ribs but a woman found breaking meat eating taboo is liable to a fine—one goat.*

Chyulu men FGD

*.....head meat, lungs, and tongue are meant for men only whether at home or in a commercial butchery and any woman found breaking this taboo is liable to a fine of one goat.....where a household has no adult men, neighbouring men are invited to eat the meat..... neck meat is given to young men.*

Kalembwani women FGD

*.....Neck and ndei meat are given to young men whereas backbone and pelvic meats are given to women..... and ingested intestines are also given to women because they are the ones who normally sweep the compound.*

.....head meat, tongue meat and lungs are for men because they are the ones who bury dead human bodies.

.....leg meat is meant for old women and any young unmarried woman eating leg meat could risk missing a husband.

.....fatless and ingest-free intestines are for men because men are allowed to have the best meat since they are the ones who buy and own livestock.

Kalembwani men FGD

.....head meat is not supposed to be eaten by women and leg meat is meant for old and divorced women only.....these taboos do not necessarily apply today—they used to apply long time ago.....

.....witch doctors never eat mutton for doing this would weaken their witch power.

Kibwezi woman SSI

.....head meat is supposed to be exclusively for men whereas leg meat is meant for old and divorced women.....these taboos are however being slowly disregarded.

Kibwezi man SSI

.....I do not believe in food taboos and I would not like to comment about other people.....

Kibwezi woman SSI

.....Head and lung meats are meant for men whereas leg meat is meant for mature women and married men.....unmarried people should not eat head and leg meats unless they want to risk missing a marriage mate.

Kibwezi man SSI

#### **5.4.2. Crop-Related Food Socio-Cultural Taboos:**

These were not many but Table 51 will help to clarify, what respondents felt about them. Only Kalembwani men FGD and one woman from Kibwezi SSI mentioned taboos associated with eating crop-related foodstuffs. A few quotes shall help our understanding of what these taboos are:

.....wild fruits are not for mature persons but for children and mature person would be belittling him/herself by eating them.....however, if a mature person is grazing in the bush, he may eat them.

.....Miraa (*Caritha edulis*) should be chewed by men only in Kalembwani area but here in Muuni it is chewed by all.

.....Porridge and milk may be used by both men and women but there are special calabashes meant exclusively for storing men's porridge and milk.....however, these special containers are rarely being used unless when there is clan members meetings..... (Kalembwani men FGD)

.....Women are not supposed to drink beer. Beer is for men only.....

(Kibwezi woman SSI)

The message we get from these quotes obviously show that there is a gender disparity deeply ingrained within Kamba food security systems. The disparity is mainly found in livestock-related foodstuffs (the community's major source of animal proteins) tend to favour men and disfavour women. However, at least some women had started realizing that those taboos were no longer important to them and they did not mind if they broke them or not.

#### **5.5. Seasonal and Drought Food Security Strategies:**

Critical periods for food security occur during drought seasons or prolonged dry spells. This topic focuses on what study respondents had to say concerning food security management during drought, dry and wet seasons.

Table 51. Kamba Food Socio-Cultural Taboos, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS		CHYULU FGD		KALEMBWANI FGD		KIBWEZI SSI		
INQUIRY	RESPONSE	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN	
<b>Animal-related food social taboos</b>	-Head meat is meant for men only	x	x	x		2	3	
	-Tongue meat is meant for men	x		x				
	-Meat eating taboos apply to game animals too	x						
	-Lung meat is meant for men only			x			1	
	-Testicles are old men's delicacy		x					
	-Hump meat is meant for youth		x					
	-Shank meat is meant for women		x					
	-Backbone meat is meant for women		x		x			
	-Neck meat is meant for youth males			x	x			
	-Meat eating taboo apply to butchery meat too			x				
	-Ndei meat is meant for youth male				x			
	-Pelvic meat is given to women				x			
	-Fatty intestines are given to women				x			
	-Fatless ingest-free intestine are for men				x			
	-Mutton not for witch-doctors						1	1
	-Shank meat is for old-divorced women						2	2
	-I don't believe in taboos						1	
	-Shank meat is for women and married men							1
	-Unmarried don't eat head and shank meat							1
	-Women can eat head meat in a butchery							1
-Youth male don't serve head meat						1		
-Monkey meat not eaten by all people							1	
<b>Crop-related food social taboos</b>	-Wild fruit for children mainly				x			
	-Miraa chewing for men				x			
	-special gourds for men's gruel and milk preservation				x			
	-Beer drinking is not for women					1		

### 5.5.1. Drought Period Food Security Strategies:

Drought was reported as being more of a problem in the Muuni area more than anywhere else. In fact, as shown in Table 52, women FGD said that droughts in the Chyulu Hills were non-existent and their men counterparts said they never experienced any. This can be understood in the light of a favourable climate that characterizes the Chyulu Hills. However, in Muuni, several strategies were adapted in order to curb drought food shortage crisis. These included government famine relief, uprooting tree stumps for charcoal making, risking cutting without permission KARI trees to make charcoal, collection and sale of firewood, fetching and sale of water, harvesting and sale of thatch grass, making and sale of wood carvings, harvesting and sale of *miraa* (*Caritha edulis*), making and sale of sheet metal products, repairing bicycles as business, milling grains as a business, committing suicide, contemplating suicide, AMREF child food aid, forced fasting for some days, casual work earnings, farm casual work earnings, and engagement in small-scale business, operating kiosks and doing shop-keeping.

Experiences of the Muuni people as a community agree with those of Akot area, Southern Sudan reported by Coutts (1998) though no reference to fish dependency is made. Coutts (1998) contends that the people of Southern Sudan need food aid provision but he is careful to note that the approach to do that should recognize that food aid may not be the only solution. Their food insecurity is aggravated by the war situation although even before the war, food insecurity associated with ecological inequilibrium and unreliable/erratic rainfall patterns forced people to adapt food security survival systems similar to what Muuni people are experiencing.

Apart from Muuni, droughts were either non-existent, were never experienced or had insignificant impact in the minds of people concerning pre-relocation areas. The following responses were received from Chyulu women FGD, indicating drought to be most critical food security period in Muuni.

*.....during drought, while some of us are still contemplating committing suicide, others have already done it.....we go without food for days and hope that some miracle would bring about food.....we cut down all trees for charcoal making when we first settled here and we are now digging out the tree stumps for the same purpose and when the stumps are finished, that is it, we have had it.*

### **5.5.2. Dry Season Food-Security Strategies:**

Strategies taken to ensure food security in dry seasons did not vary greatly from those taken during drought periods. However, in the Chyulu Hills and Kibwezi area, study respondents said that people usually had sufficient food reserves to cater for household food needs during dry season periods as shown in Table 53. Root crops especially cassava and also sweet potatoes play a considerable role during this season. Credit food borrowing is commonly practiced during this time. One of the Kibwezi women SSI said the best food security strategy during this time is to be able to store seeds for planting on the onset of rain. Chyulu men FGD confessed that they risked stealing charcoal-making wood from the neighbouring Kenya Agricultural Research Institute's (KARI) property. Talking about Muuni, Men FGD said that those who have oxen plows would engage in preparing peoples' land for money. Small-scale business, kiosks, casual labour wage earnings, employment savings, and famine relief food were some of the other but insignificant strategies employed to alleviate starvation during this season as can be seen in Table 53.

The message received from this information indicate that whereas only a few strategies were employed by the people to curb food insecurity during drought and dry season periods in the pre-relocation areas, several strategies were necessary in doing the same in Muuni area given the harsh environment, unreliable and erratic rainfall characterizing this area. Additionally, small private land holdings denied people a chance to carry out a spatial exploitation of vegetation resources that they were used to in their pre-relocation areas.

### **5.5.3. Wet Season Food-Security Strategies:**

This season was by no means considered critical as far as household food security was concerned. Many respondents did not even see the need to respond to this question since they often reiterated that what they needed to alleviate the food shortage problem was sufficient regular rainfall. However, for those who responded, the early part of the season was said to be usually critical because the crop has not yet matured for household use. During that period, people employ various strategies to cater for their food needs. As shown in Table 53, these include the use of wild vegetables, famine relief food, purchased food, sale of goats, farm casual labour wages and charcoal making. It is worth noting that even after harvesting, people said they had just enough for household use only.

Plate 9. Typical onset of a rain season, Muuni Settlement Scheme, Makueni, District, Kenya, 1997.



Plate 10. Happy condition of Maize crop on well drained soil, Small ruminants on lush forage and householders on hopeful expectation following the 1997/98 El-nino rainfall. Muuni Settlement Scheme, Makueni District, Kenya, 1997.





Plate 11. Maize crop on a water-logged area following the 1997/98 El-nino Rainfall, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Plate 11b. Maize and cowpea crops in water-logged area and the Chyulu Hills at the background following the 1997/98 El-nino Rainfall, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



It is important to note that while people in the Chyulu Hills and Kalembwani said that they would use wild vegetables and sell goats/use stored food , respectively at Muuni, the same people said that they would have to wait for the meagre famine relief erratically supplied by the government among other strategies. This obviously indicate that the pre-relocation areas were viewed as having stronger food security systems than in Muuni. This was attributed to the good climate and possibility of spatial exploitation in the former areas.

Table 52. Drought Period Food Security Strategy, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS INQUIRY	CHY		MUN		FGD		KAL		MUN		FGD		KAL		MUN		KIB		SSJ		MUN		KIB		SSJ						
	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN			
Drought Period Food-security Strategy.	x		x																												
	-droughts are non-existent -never experienced one -rely on salary/wage earning children -food relief from well- wishing NGOs																														
	-stump uprooting for charcoal making -government famine relief food		x																												
	-commit suicide -contemplate suicide -AMREF		x																												
	-sale of livestock -go hungry for days -charcoal making -casual employment																														
	-upper Chyulu community and government's famine relief supported lower Chyulu community																														
	-no serious drought was experienced -use of employment earnings -casual work earnings from anywhere																														
	-charcoal sale -ephemeral food storage -farm casual labour earnings from farms -small-scale business																														

Table 53. Wet and Dry Period Food Security Strategies, Muuni Settlement Scheme, Makuani District, Kenya, 1997.

INQUIRY	RESPONSES	CHY		MUN		CHY		MUN		KAL		MUN		EGD		KIB		MUN		SSJ		KIB		MUN		SSI						
		CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN	CHY	MUN			
Wet Seasons Food-security Strategies	-use of wild vegetables	x																														
	-meager government																															
	-famine relief	x																														
	-have just enough for consumption not storage																															
	-rely on purchase food																															
	-sale of goats for food																															
	-have enough yield from farms																															
	-use of stored foodstuff																															
	-casual labour earning from farm work																															
	-have plenty from farms																															
Dry Seasons Food-security Strategies	-just enough from farms																															
	-farm food available																															
	-charcoal making																															
	-No response																															
	-sufficient harvest storage																															
	-cassava	x																														
	-sweet potatoes	x																														
	-papaws	x																														
	-sell livestock	x																														
	-go hungry for days	x																														
	-borrow money	x																														
	-famine relief	x																														
	-borrow foodstuffs from local kiosks on credit	x																														
	-stump uprooting for charcoal making	x																														
	-use of available wild food	x																														
-buy food	x																															
-small-scale business																																
-charcoal sale																																
-Farm casual labour earnings																																
-oxen-plowing for pay																																
-steal charcoal wood from KARI property																																

Table 53. Cont'd.	<ul style="list-style-type: none"> <li>-work in sisal plantations</li> <li>-AMREF child health food</li> <li>-Storage of planting seeds</li> <li>-no defined strategy</li> <li>-use of employment earnings</li> <li>-wage earning anywhere</li> <li>-ephemeral food storage</li> <li>-government's relief food</li> </ul>												

## **5.6. Business and Family Social Net-Work Food-Security Strategies:**

Although not all people were engaged in business, it played a considerable role as a measure taken towards food security. Business mentioned in this study was only small-scale local kiosk operation or the sale of vegetable and fruits mainly by women. Another strategy for food security was nuclear and distant family members. Nuclear family members included sons and daughters whereas distant family members could be any one of the clan's members. Table 54 shows responses made by the study respondents about these food-security strategies.

### **5.6.1. Remittance and Contribution of Sons/Daughters Towards Household Food-Security:**

Table 54 shows how study respondents viewed their sons and daughters as means of ensuring household food security. Sadly, in Muuni some parents do not only have to rely on their employed children but had to encourage or force their children in farm or house maid wage labour in order to raise money to augment household meagre food resources. While in the Chyulu Hills, people did not rely on their children unless it was extremely necessary to do so. This can be supported by the fact that in Table 54 Chyulu women and men FGD have said child support was only necessary in time of dire food scarcity. Otherwise men said parents were self-sufficient with food and did not bother their children. This shows how the relocation affected peoples' lifestyles adversely and the painful adjustment process they have to undergo in order to survive under Muuni's harsh conditions.

### **5.6.2. Remittance and Contribution of Kin/Close Relatives Towards Household Food-Security:**

Kin and relatives did not appear to play a major role in ensuring household food security as Table 54 portrays. This can be understood by looking at the responses made by various study respondents. For instance, in Muuni women FGD said food security support from this source was of lesser importance rather a considerable one than a strong one whereas Kalemwani men FGD said this source was unreliable. Food security was not a critical issue in the former settlement areas but it is interesting how Kamba and Maasai people engaged in barter trade of food grain and milk exchange in Kalemwani. This can be understood in the view of the fact that whereas the Kamba people are traditionally agro-pastoralists, the Maasai people are pure pastoralists. Their co-existence

therefore called for a mutual barter exchange involving grain from the Kamba and milk from the Maasai.



Table 54. Business and Family Social Net-Work Food-Security Strategies, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS	CHIY		EGD		MUN		KAL		EGD		KAL		MUN		KIB		SSJ		MUN		
	CHIY	MUN	CHIY	MUN	EGD	MUN	KAL	MUN	EGD	MUN	KAL	MUN	KIB	MUN	KIB	MUN	KIB	MUN	KIB	MUN	
<b>INQUIRY</b> From Sons and Daughters  From kin and close relatives	x																				
		x																			
			x																		
				x																	
					x																
						x															
							x														
								x													
										x											
												x									
													x								

<b>Table 54.</b> <b>Cont'd.</b> <b>From Business</b> <b>ventures</b>	<i>-Considerably reliable and profitable</i> <i>-Few people involved and unprofitable</i> <i>-Very profitable and reliable</i> <i>-Yes but marginally</i> <i>-Yes it contributes</i> <i>-Not inquired</i>	x	x	x	x	x	x	x	x	x	x	x	x

### **5.6.3. Business Contribution Towards Household Food-Security:**

Whereas business is said to be either a considerably profitable or a very profitable venture in the Chyulu Hills, the same is said to be either unprofitable or marginally profitable in Muuni according to what study respondents said and portrayed in Table 54. Kalemwani respondents reluctantly affirmed that business contributed towards household food security. It is important to note that business was not carried out by all households but there were direct or indirect social implications involved in as far as this source was used to alleviate food security problems. These are usually intricate and exploitive means by which some business operators offer food credit to the disadvantaged in exchange with pledges, mortgages and black mail based on labour, personal property and sexual advances.

### **5.7. Food-Security Strategy by Means of Non-Traditional Food Production Practices:**

Traditional food production practices by Kamba people is agro-pastoral by nature. This nexus involves keeping livestock on the one hand and producing crop food on the other. Rather than forming a dichotomy, the two components form a nexus which is highly and intricately complementary. Under traditional practices crop production practices involve the use of crude and simple hand tools to till the land. A variety of grain seeds, pulses, tubers, root, creepers etc. are grown often in mixed stands and rarely as a single or pure stand. Monoculture is unknown within Kamba traditional farming practices because this would not be a good food security strategy due to weather and disease risks. Within a traditional context, planting a mixture of crops would ensure food security by spreading the risks of crop failure due to demonic intrusions or otherwise. The use of fertilizers, farm chemicals and heavy farm machinery is not common practice within Kamba farming tradition. As far as traditional Kamba livestock breeds are concerned, East Africa Short Horn Zebu (EASHZ), Small East Africa (SEA) and Red Maasai dominated their cattle herds, goat and sheep flocks, respectively.

On the other hand, non-traditional practices would involve the use of farm fertilizers, pesticides, herbicides, hybrid seeds and heavy farm machinery. Additionally, grade livestock, veterinary medicine and services and commercial livestock supplementation would be expected to have a considerable influence on peoples' farm production practices. This topic reports what the study respondents said concerning the use of farm fertilizers, animal manure and other farm chemicals and also the use of tractor and oxen ploughs as a means for improving their food-security status.

### **5.7.1. Use of Fertilizers, Animal Manure and Farm Chemicals for Boosting Food-Security status:**

Statements made by study respondents and recorded in Table 55 clearly show that the application of these items was not significant. In other words, these practices were not used either in pre- or post-relocation areas. Even where some respondents indicate insignificant use this was mainly to do with application of animal manure---- a sub-conscious rather than a conscious practice.

### **5.7.2. Use of Tractors and Oxen Ploughs for Boosting Food-Security Status:**

As highlighted in Table 55, these services were desirable and necessary for people but only a few of them could afford ownership or the hire charges for their services. Occasionally, people would make special arrangements in order to obtain their services. Special arrangements in this case would be for instance, rendering of labour, provision of pasture, provision of crop residue in exchange of plowing services and, payment of hard cash in exchange of tractor service.

In the Chyulu Hills, these services were not necessary due to steep and rocky land terrain. However, the service was used by those living on the lower less steep and stoneless slopes of the Hills.

Though not directly enquired my personal observations, use of anecdotes and my long-term experience of the Kamba community as a whole convince me that use of hybrid seeds, ownership of grade animals and the use of veterinary services and facilities are highly desired items only enjoyed by the few privileged. In Muuni, such privileges were insignificant or simply non-existent.

### **5.8. Agencies Providing and Supporting Food-Security Systems:**

This section helps in determining the role aid agencies play in the food security status of households as a result of the adjustment process following relocation. Aid agencies played quite a considerable role in supporting community's food-security. This was either done directly or indirectly as shown in Table 56. In Tables 39b. through to 39d. direct and indirect forms of food-security promotions are shown in further details.

### **5.8.1. Providers of Famine Relief Foods and Food-Security Promotional Ideas:**

Although many other agencies are mentioned elsewhere by the study respondents, when the inquiry was specifically made with respect to an agency's role in food-security, only four agencies seem to have made impact in this issue. These are the Government of Kenya (GOK) and of India (GOI), the African Medical Research Foundation (AMREF) and World Vision. However, as shown in Table 46 GOK and AMREF compared with these other agencies appear to have an upper hand in contribution.

### **5.8.2. Agricultural Agents as Food Security Promoters:**

Agricultural extension agents promoted food security by providing up to date farm and animal husbandry practices. Asked the extent to which these services were available to them, the study respondents came up with several answers as shown in Table 56. Chyulu women FGD said that these extension agents did not routinely visit them when residing in the Chyulu Hills probably because of the part of the Chyulu Hills they had come from. This may be evident due to the fact that their men counterparts said that these services were available. In Muuni they said they were taught about new extension ideas only in public meetings. On the other hand, the Chyulu men FGD responded differently by saying that the services were available both in the Chyulu Hills and in Muuni. Likewise, the Kalembwani women FGD said the services were available in Kalembwani and in Muuni too. However, the Kalembwani men FGD said something different. They said some of them had already visited Farmers' Training Centres (FTCs) and Agricultural Research Centres while residing in Kalembwani and that they were already aware of some agricultural technologies they could put in use at Muuni when soil moisture is adequate. This can be understood in view of the fact that the Machakos Farmers Training Centre was nearer the Kalembwani people than these other groups. Of course men would be expected to attend these week-long courses while women are left behind to take care of the households. This reflects a patriarchal domination over women, characteristic of many African tribes.

- This chapter has helped us visualize how the food security objectives for this study were met. For instance, although the primary objective is to improve our understanding of the role livestock production plays in socio-economic processes of change in semi-arid areas of Kenya, the study results did not support this source as an important one under Muuni conditions. In relation to crop production, the role of livestock in the subsistence pattern and its contribution to household income and food

security assumes a secondary position under Muuni conditions. However, it was viewed as an important source of food security in the pre-relocation areas.

- The objective on 'changing social relations between individuals and groups which result from relocation to semi-arid' areas is addressed in view of the fact that peoples' pre-relocation lifestyles were modified according to the situation they found themselves in at Muuni. Whereas they depended mainly on agro-pastoral production systems to meet their subsistence needs in their pre-relocation areas, at Muuni, they had to exploit several other opportunities to ensure household food security. How they did that depended on individual households but as a community Muuni people exploited all the opportunities shown in the foregoing chapter.
- In order to determine the food security status of households as a result of the adjustment process, we have seen the many ways people have used to ensure food security. Majority of these sources are applicable under Muuni situation which indicate that people will use every possible means of survival under stressful food security situations. As for the pre-relocation areas, food security was adequately taken care of by the agro-pastoral practices although other strategies were employed in times of dire need.
- Changes in individual and group values and attitudes toward animal husbandry were very pronounced under Muuni situation. The value attached to livestock husbandry in the pre-relocation areas was eroded under Muuni conditions and people sort alternative means of survival as shown in the foregoing chapter.

Table 55. None-Traditional Food Production Practices for Boosting up Food-security Status, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

RESPONDENTS INQUIRY	RESPONSES	CHY Y FGD		CHY P FGD		KAL Y FGD		KAL P FGD		KIB Y SSI		KIB P SSI	
		CHY	MUN	CHY	MUN	KAL	MUN	KAL	MUN	KIB	MUN	KIB	MUN
Fertilizer, farm chemicals and farm manure application	-never applied	x											
	-highly insignificant		x										
Use of Tractor and Oxen Plows	-Not inquired (see FGD for a clue about Kibwezi respondents)				x								
	-only those who own or can afford their services				x								
	-financially unavailable under special arrangements												
	-area was hilly and rocky, so only simple hand tools were used.												
	-only on lower stoneless areas	x											
-Not inquired (see FGD for a clue about Kibwezi group)	x												

Table 56. Agencies Providing and Supporting Food-Security Systems, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

RESPONDENTS INQUIRY	CHY		MUN		CHY		EGD		KAL		MUN		EGD		KAL		MUN		EGD		KIB		MUN		SSJ		KIB		MUN				
Providers of Food relief and food-security Ideas	x					x																											
Providers of Agricultural extension services in support of food-security strategies																																	



## 5.9. Conclusions:

- ◆ The foregoing chapter justifies the importance of food security and how people involve themselves into production activities that ensure availability of food for their households. The chapter also analyses and describes other avenues used to ensure food security especially during stressful periods. The study primary objective of improving our understanding of the role livestock production plays in socio-economic processes of change in semi-arid areas of Kenya has not been strongly supported by the results of this study especially under Muuni conditions. People employ several food security measures as an adjustment process to cope up with difficult situations.
- Pre-relocation food security situation was better than the post-relocation one.
- Traditionally and under normal weather conditions, Kamba people as a community meet their food security needs by engaging in livestock and crop production. However, in the contemporary times, crop production becomes more important in meeting day-to-day household needs than does the livestock.
- When weather and ecological conditions are unfavourable other means such as the use of wild food crops and game meats become handy although this is not a reliable means and is used as last resort.
- Regardless of the settlement area, priority cultivated food include maize, beans, cowpeas, green grams and pigeon peas. Other food types such as sorghum, finger millets pumpkins, gourds, cassava and sweet potatoes are also important especially during stressful periods.
- Where weather conditions are permissive, for instance in the Chyulu Hills, fruit trees are grown and contribute greatly to household food security.
- Food security status becomes critical during dry weather and drought periods. During such times, people adjust variably in their endeavour to meet their daily household needs. Such endeavours include one or more of the following activities:
  - \* Engagement in charcoal making and selling; collection and sale of firewood; fetching and sale of water; harvesting and sale of thatch grass and; wood carving and sale of wood carving products; sheet metal work and sale of sheet metal products; bicycle repairing; milling and; harvest and sale of *Miraa* (*Caritha edulis*).
  - \* Reliance on wage and farm casual labour earnings.
  - \* Engagement in small-scale business venture.
  - \* Reliance on employed sons' and daughters', kin's and close relatives' support.

- \* Reliance on external aid food relief programs and food production promotional ideas.
- \* Use of wild foods and game meats.
- \* Use of intricate and exploitive food credit in exchange with pledges and mortgages based on labour, personal property and sexual lusts.
- \* Forced fasting.
- \* Ending or contemplating to end one's own life as a last hopeless resort.
- Kamba people as a community enjoy numerous food dishes especially during time of plentifulness. However, these dishes become scanty in time of food insecurity.
- Kamba food social taboos are mainly based on eating of meat and appear to favour men and deprive women of prime cuts.
- Food security promotion by the use of non-traditional food production practices such as, application of fertilizers and animal manure on the farms, the use of tractor and oxen plows in improving soil water retention capacity, the use of hybrid seeds, application of crop pesticides and herbicides and the use of veterinary medicines to control livestock diseases did not make a considerable impact on peoples' farm and livestock production lifestyles both in pre- and post-relocation areas.
- In view of the foregoing conclusions, it is obvious that the uncertain and unequilibrium status of semi-arid areas of Kenya and elsewhere signal food insecurity most of the time. The food security situation gets worse when people in these areas are forced to shift in absence of proper prior planning---the case of Muuni community. Further, most of the above conclusions affected Muuni households food security negatively---a case that calls for national agricultural research programmes such as KARI to design efficacious dryland agricultural technologies appropriate for the circumstances of agro-pastoralists in semi-arid areas.

## **CHAPTER 6.**

### **STATISTICAL ANALYSIS OF 30-INPUT AND OUTPUT FARM DATA:**

#### **6.1. Introduction:**

Although the primary objective of this study is to improve our understanding of the role livestock production plays in socio-economic processes of change in semi-arid areas of Kenya, this chapter makes it clear that farm production is a major feature of the resettlement schemes in these areas.

During land distribution in 1992, all eligible households were allotted 10 acres (4 ha). How they used the land was their responsibility and depended on their family size; knowledge; purchase power; interests; and expertise.

This chapter reports the results of farm production in relation to rainfall, soil and farm inputs as recorded by the sample of 30 selected farmers. The sample farmers were distributed in the whole of the settlement scheme. These farmers recorded daily farm inputs and outputs from the beginning of February, 1997 to the end of April, 1998. Each of the sample farmers was provided with a duplex rain gauge bought from Britain and a record sheet and instructed on how to record rainfall on a daily basis. Daily rainfall recording by farmers themselves started on May 14, 1997 and continued until April 30, 1998. Recording households were asked to state the following: what they perceived to be their soil type; information on crops grown; acreage for each crop; and type and number of livestock owned and all these were recorded. Labour input was recorded on daily basis by the farmers themselves and most of it was mainly provided by family members but where necessary group labour was used. On very rare occasions hired farm labour was used. Farm yields estimates (Figure 3j.) were recorded at the time of harvest. Purchases and sales of all farm-related commodities were recorded on a daily basis by the sample households (Friedrich, 1977). Figures 3k and 3l show livestock numbers purchased and sold by the sample householders in the course of the study. To understand how various categories of the householders performed in their farms, they were grouped into 3 socio-economic groups namely, highest, medium and lowest. Figures 4 through to

19 show the value in Kenya shillings of all farm outputs realized and inputs incurred by the 30 sample householders in the course of long and short rain seasons.

During the long and short rain seasons, Maize, beans and cowpeas are usually grown by majority of the householders. Similarly, some householders keep small herds of cattle, and flocks of small ruminants. From these they get some little milk or sometimes sell them for cash. Some purchase livestock mainly for breeding purposes (Table 63). Almost every householder keeps some chicken. Figures 20 through to 40 show percentage value in Kenya shillings of the outputs and inputs for these items from the responding householders during the long and short rain seasons. As much as possible these figures are placed together for the convenience of comparison between the first and the second rain seasons of 1997/1998, the period in which this study took place.

This recording exercise covered two growing and two dry seasons stretching from February 1997 to April 1998. Tables 57 and 58 show major variables which emerged as a result of this activity. The variables were then subjected to a regression model whose results are the subject of discussion in this chapter.

Figure 3j. Location of the Recording Households Showing Maize and Cowpeas Yields (kg) During the Long and Short Rain Seasons, Muuni Settlement Scheme, Makueni District, Kenya, 1997

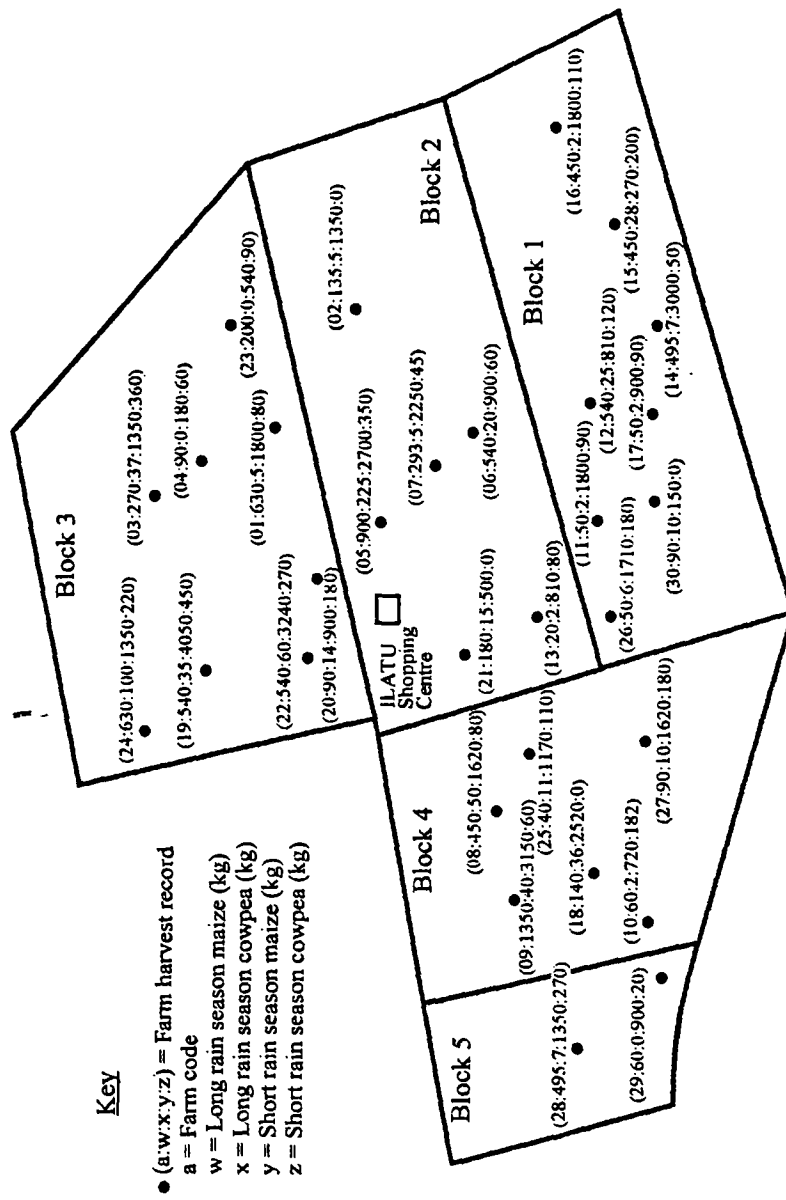


Figure 3k. Location of the Recording Households Showing Total Livestock Numbers Purchased During the Long and Short Rain Seasons, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

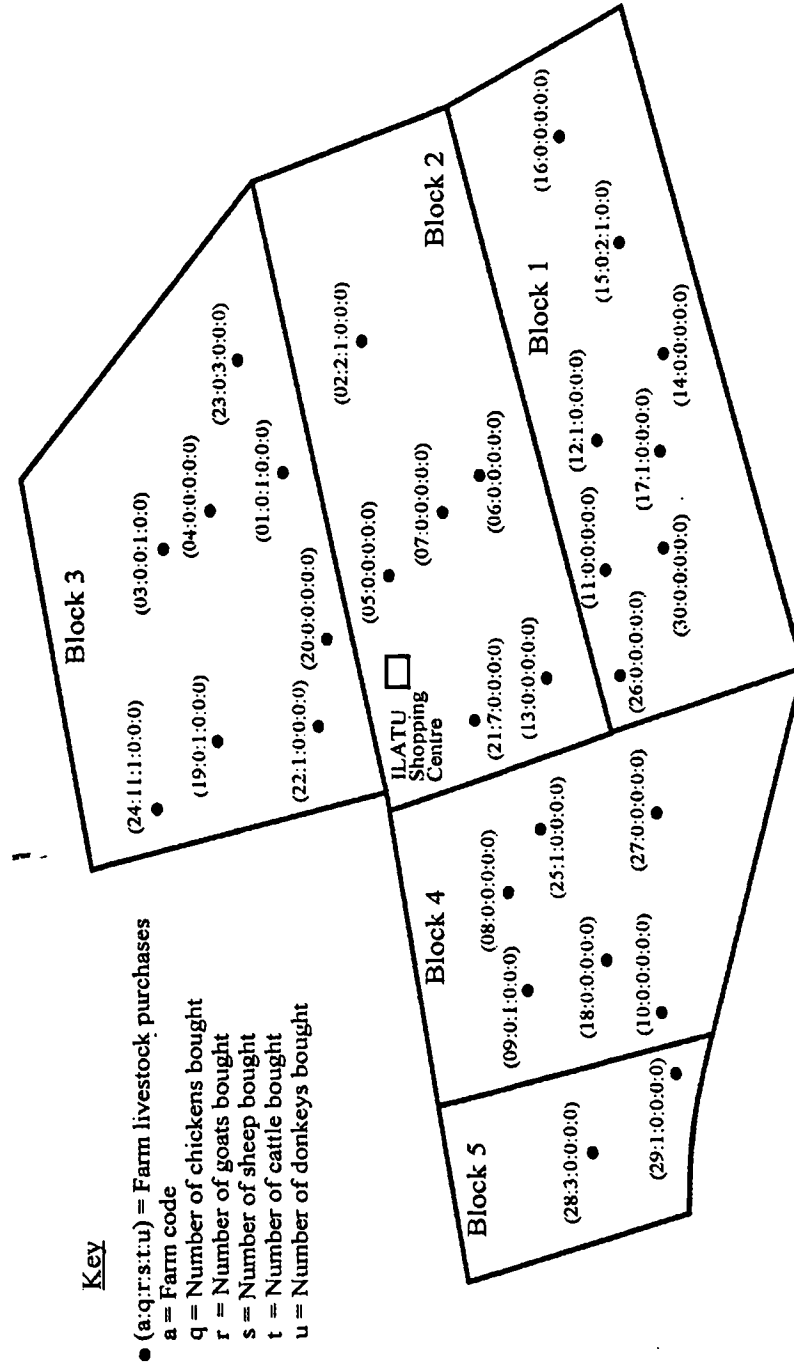


Figure 31. Location of the Recording Households Showing Total Livestock Numbers Sold During the Long and Short Rain Seasons, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

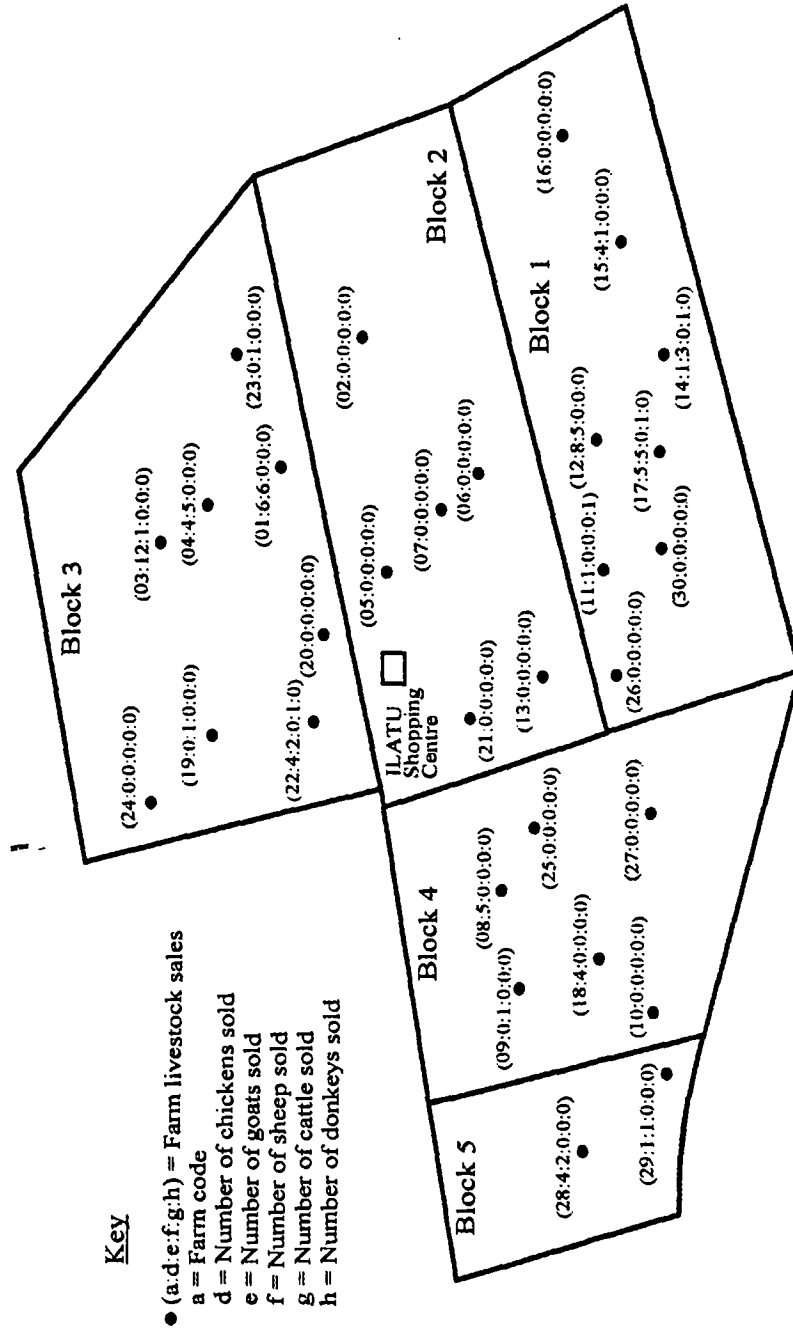


Table 63. Sales and Purchases of Livestock by the sample Householders during the Short and Long Rain Seasons, Muuni settlement Scheme, Makueni District, Kenya, 1997/98.

Farm Code	NUMBER OF LIVESTOCK SOLD										NUMBER OF LIVESTOCK PURCHASED									
	Chicken		Goat		Sheep		Cattle		Donkey		Chicken		Goat		Sheep		Cattle		Donkey	
	LR *	SR **	LR	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR	SR
01	2	4	4	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
02	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0
03	2	10	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
04	2	2	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
12	4	4	2	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
15	4	0	1	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	2	3	5	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

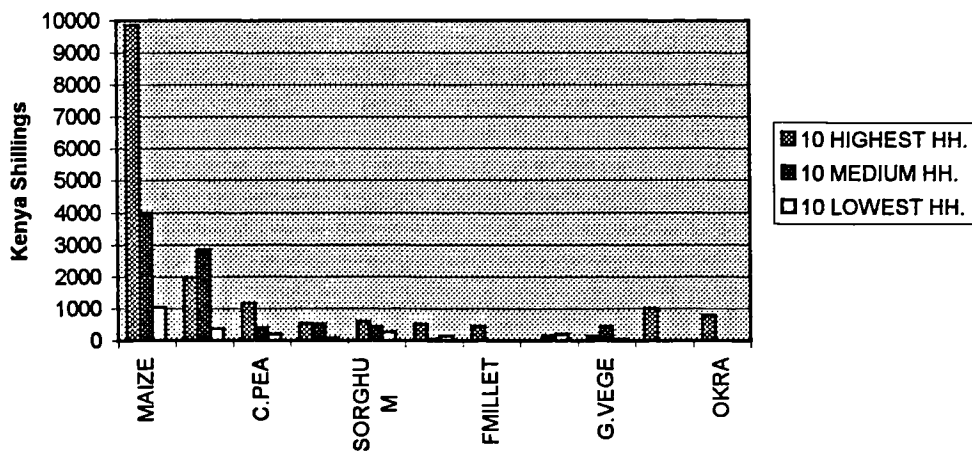


Table 63. Cont'd.

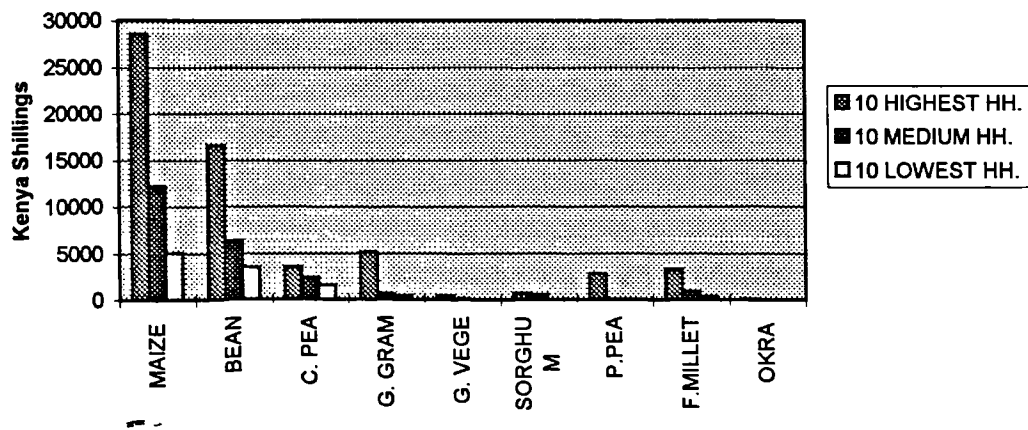
21	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0
22	2	2	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
23	0	0	1	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	1	10	0	1	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	1	3	1	1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0
29	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\* LS= Long Rain Season: \*\* SR= Short Rain Season

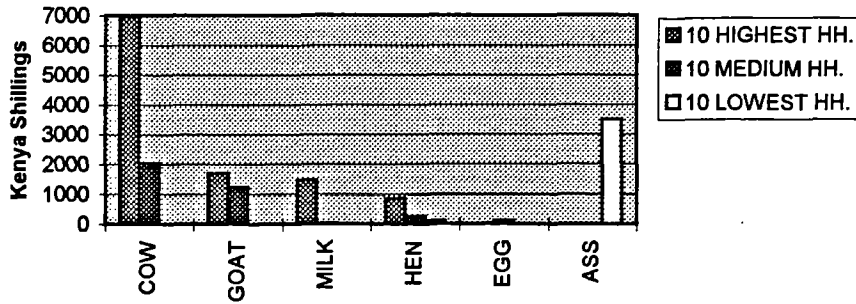
**Figure 4. Value of Crop-Related Outputs, Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya 1997.**



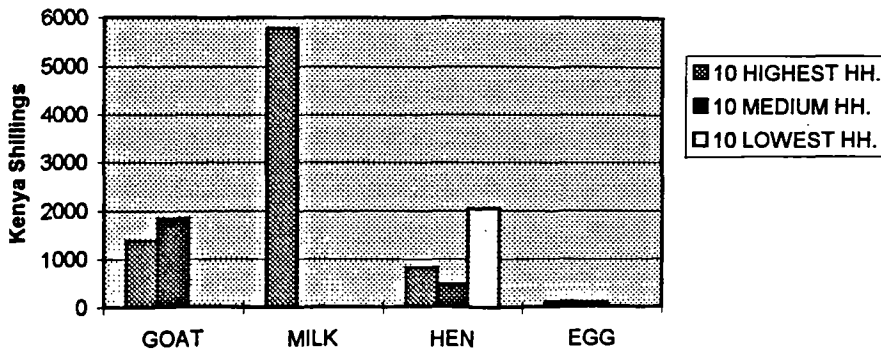
**Figure 5. Value of Crop-Related Outputs, Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.**



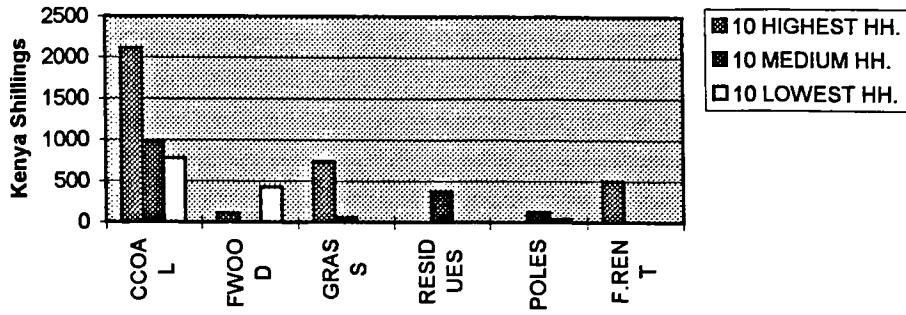
**Figure 6. Value of Livestock and Livestock-Related Outputs, Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.**



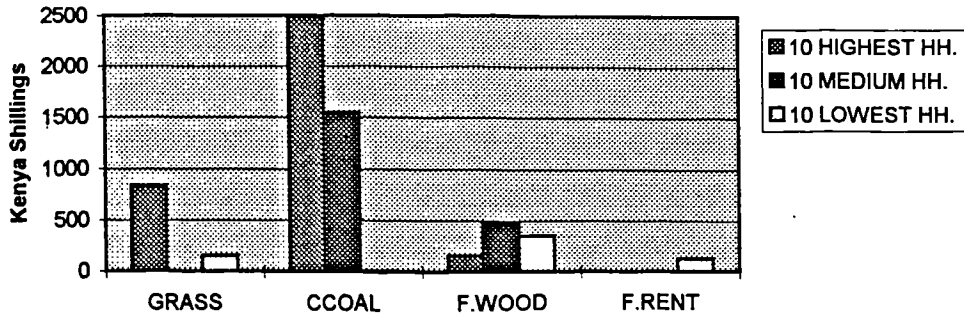
**Figure 7. Value of Livestock and Livestock-Related Outputs, Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.**



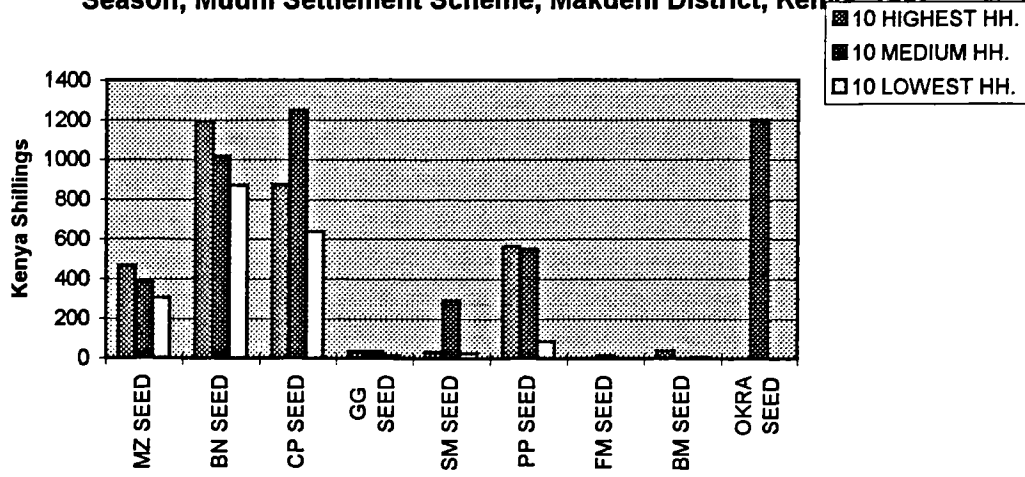
**Figure 8. Value of Output for other Land Natural Products, Long Rain Season , Muuni Settlement Scheme, Makueni District, Kenya, 1997.**



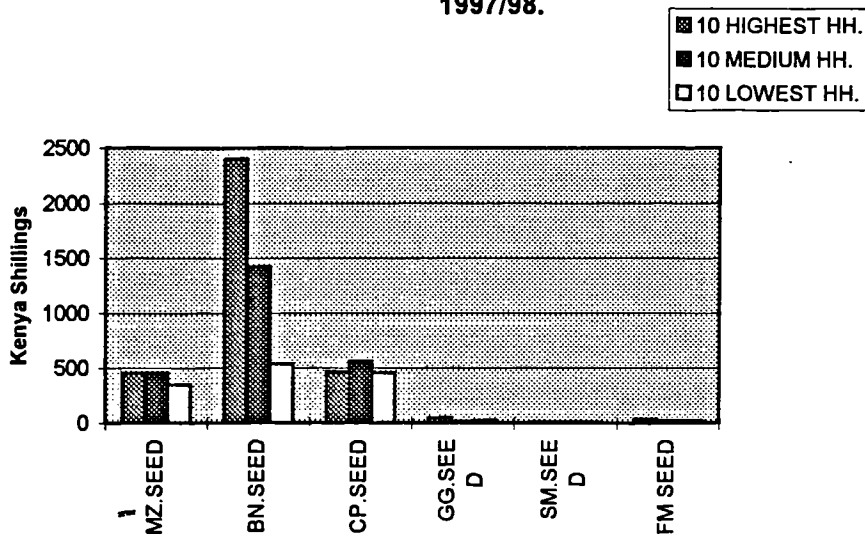
**Figure 9. Value of Output for other Land Natural Products, Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.**



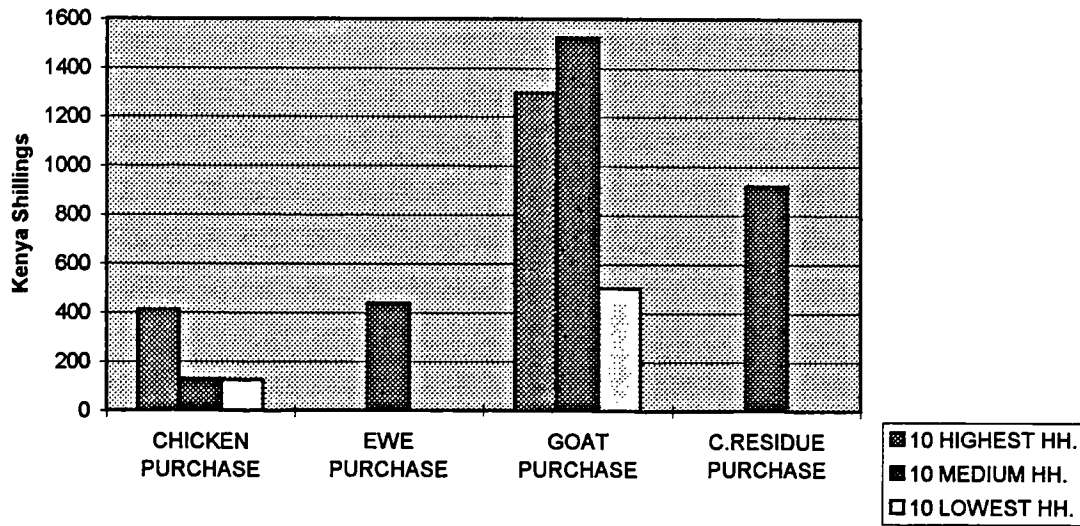
**Figure 10. Farm Inputs for Crop-related Seed Costs, Long rain Season, Muuni Settlement Scheme, Makueni District, Kenya 1997**



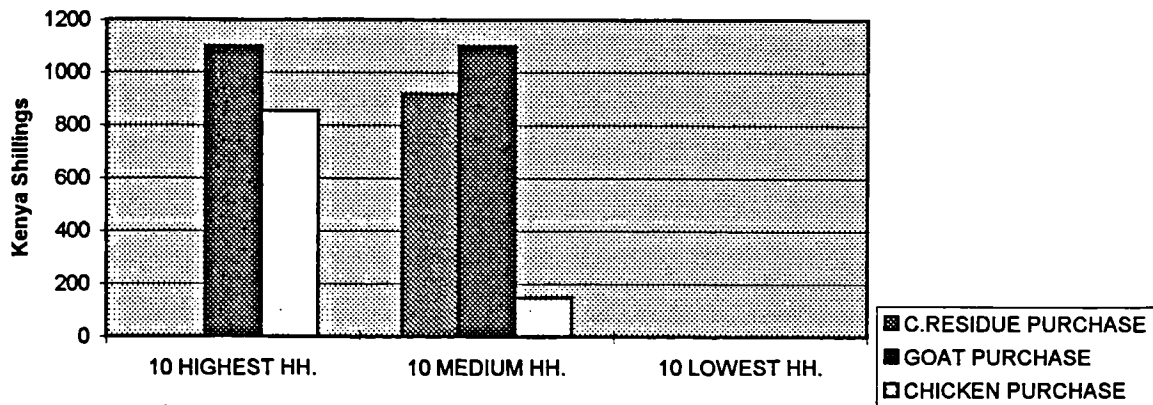
**Figure 11. Farm Inputs for Crop-related Seed Costs, Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya 1997/98.**



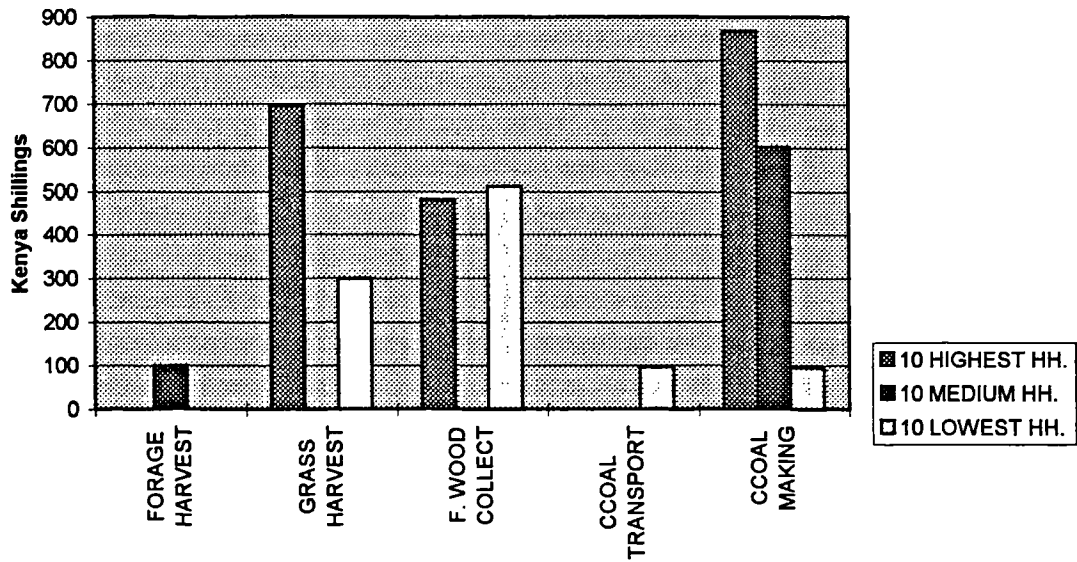
**Figure 12. Farm Inputs for Livestock-related Production Purchases, Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.**



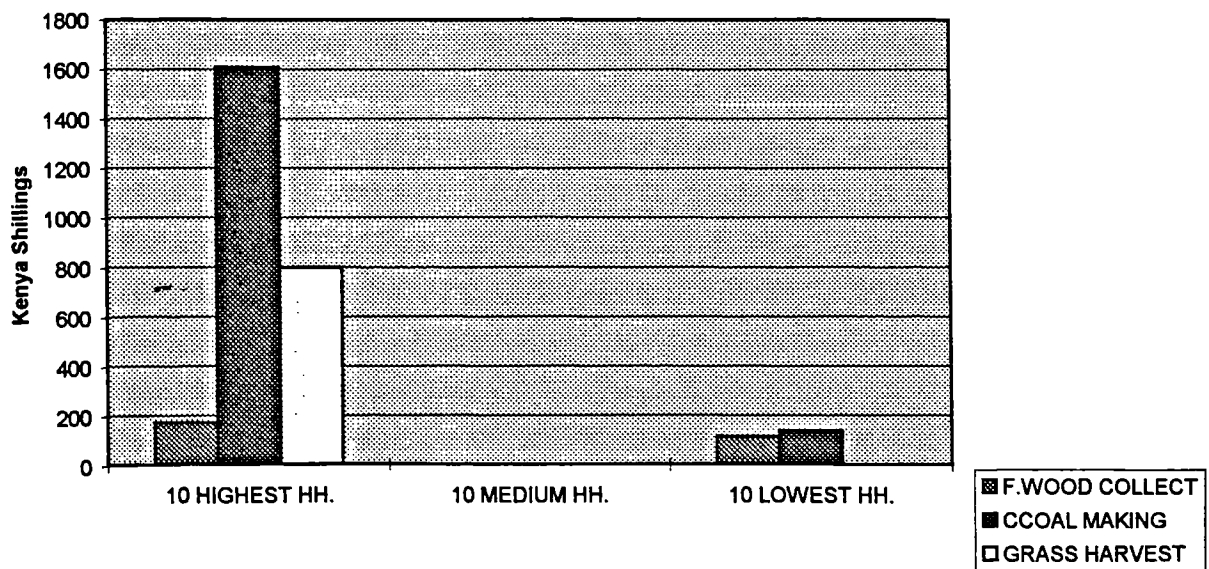
**Figure 13. Farm inputs for Livestock-related purchases, Short rain season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.**



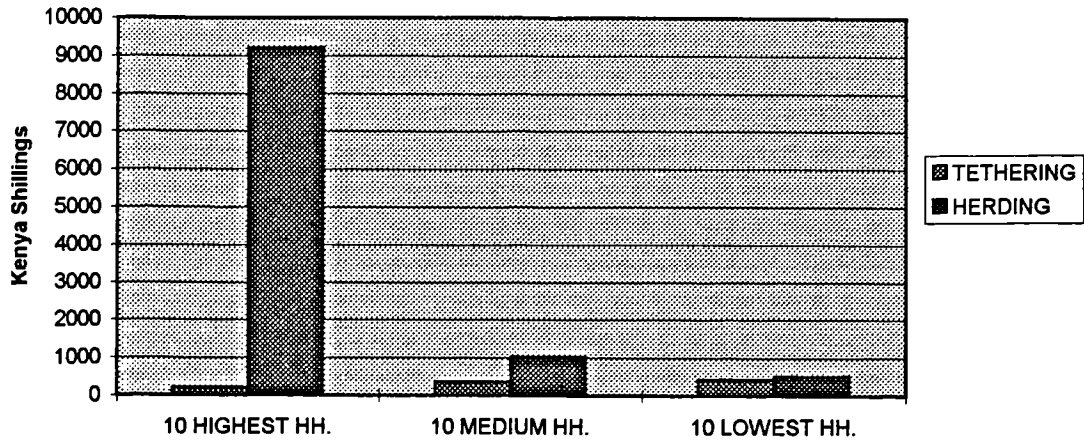
**Figure 14. Farm Inputs for Natural Resource Labor Costs, Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.**



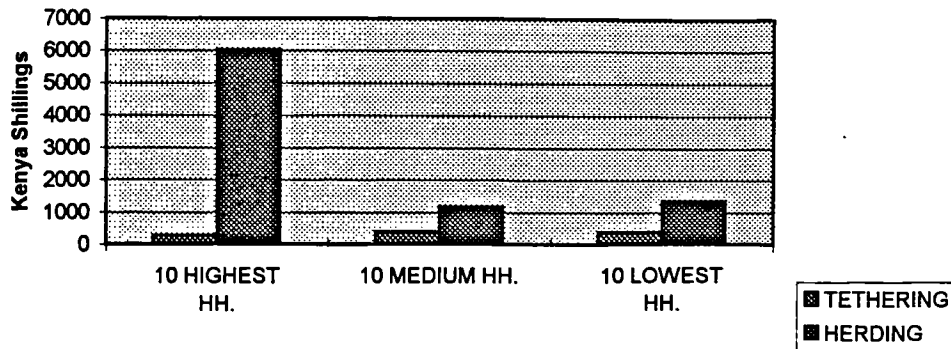
**Figure 15. Farm Inputs for Natural Resource Labor Costs, Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.**



**Figure 16. Farm Inputs for Livestock Management Costs for long rain season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.**

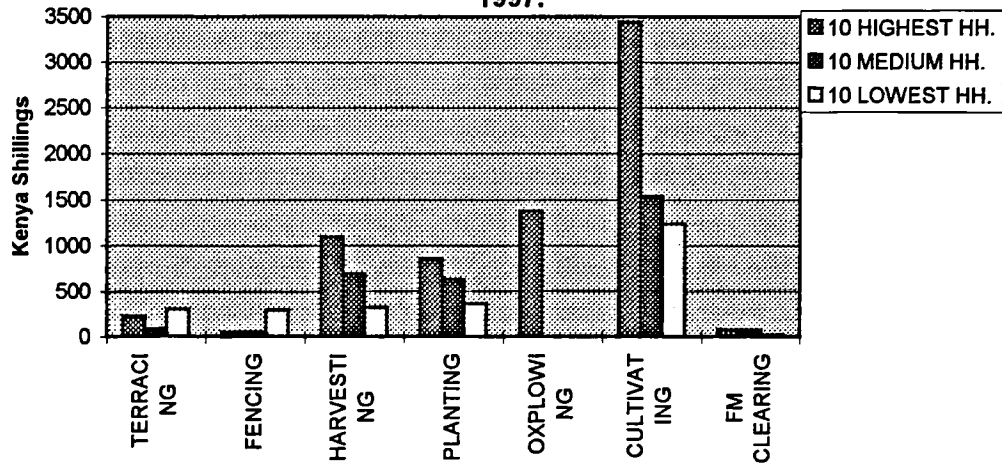


**Figure 17. Farm Inputs for Livestock Management Costs, Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.**





**Figure 18. Farm Inputs for Crop Production Labor Costs, Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.**



**Figure 19. Farm Inputs for Crop Production Labor Costs, Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.**

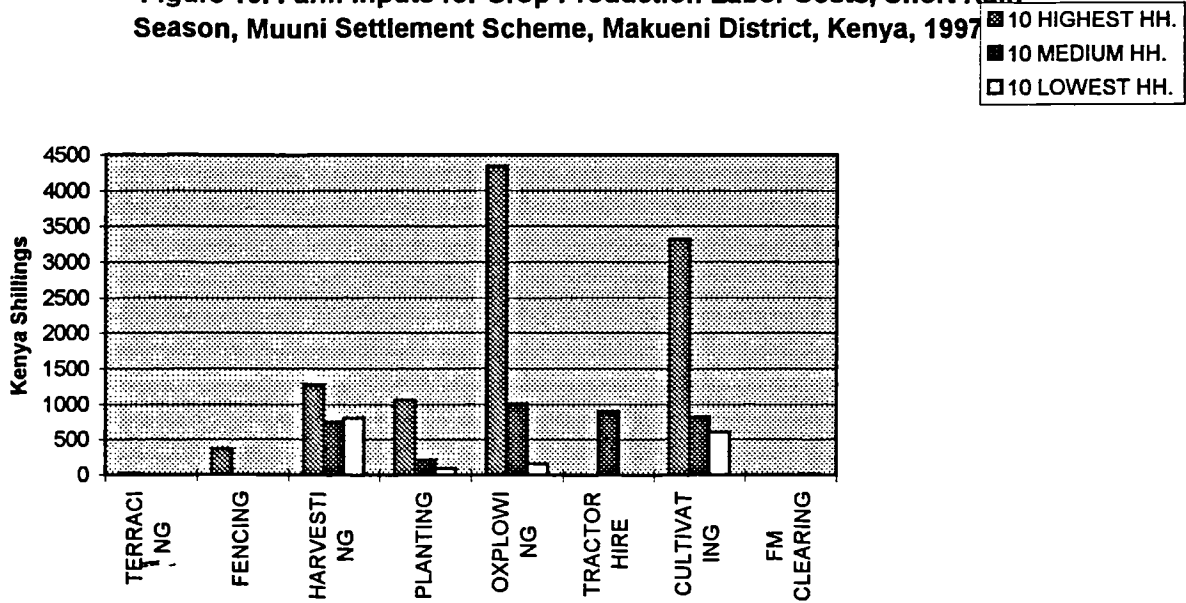


Figure 20. Output in Kenya Shillings for the 10 Highest Households during the Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

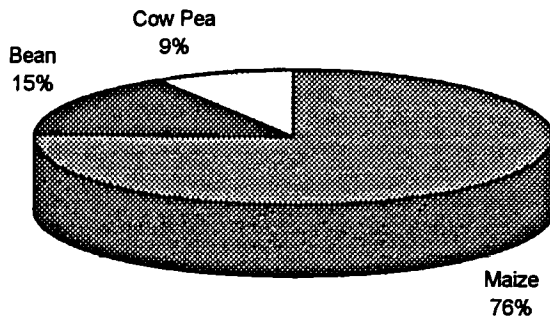


Figure 21. Output in Kenya Shillings for the 10 Highest Households during the Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

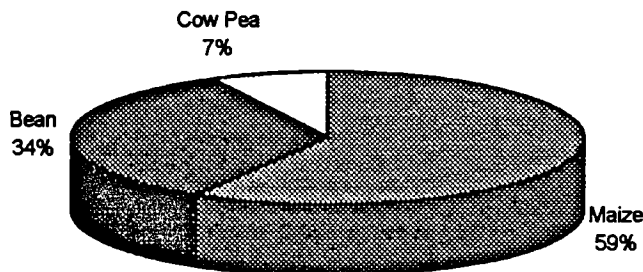


Figure 22. Output in Kenya Shillings for the 10 Highest Households during the Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

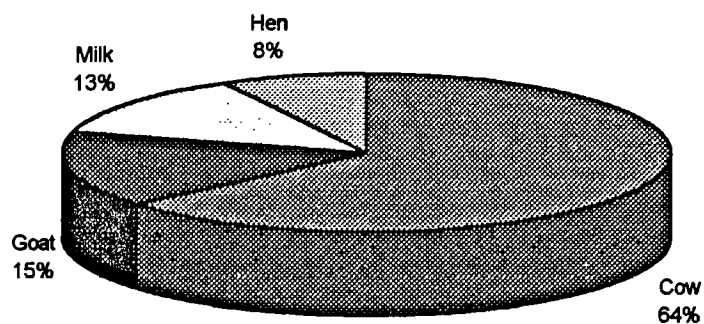


Figure 23. Output in Kenya Shillings for the 10 Highest Households during the Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

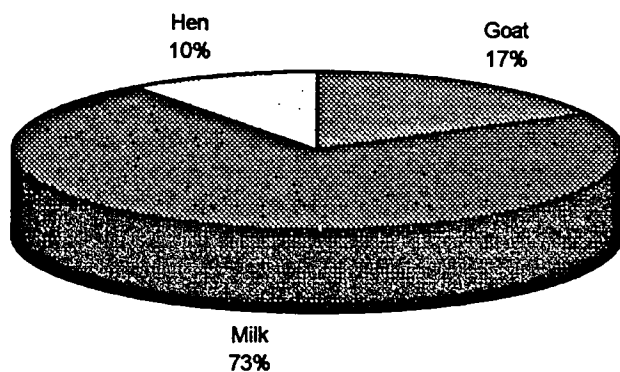


Figure 24. Output in Kenya Shillings for the 10 Medium Households during the Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

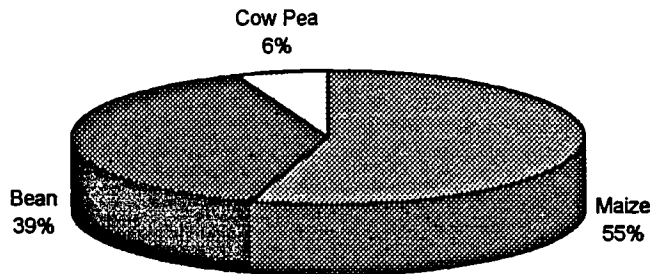


Figure 25. Output in Kenya Shillings for the 10 Medium Households during the Short Rain, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

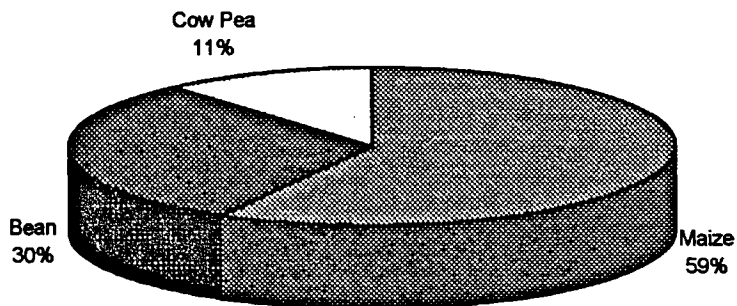


Figure 26. Output in Kenya Shillings for the 10 Medium Households during the Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

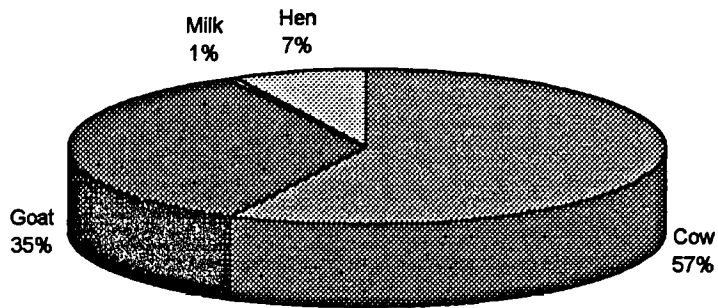


Figure 27. Output in Kenya Shillings for the 10 Lowest Households during the Long Rain, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

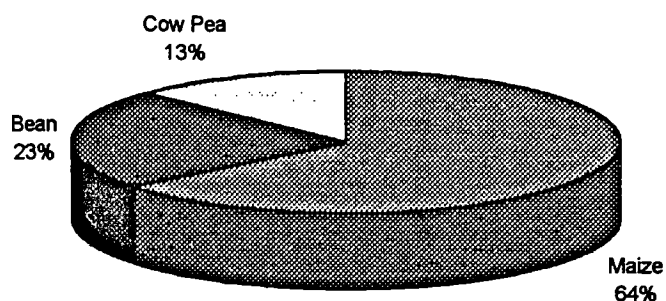


Figure 28. Output in Kenya Shillings for the 10 Lowest Households during the Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

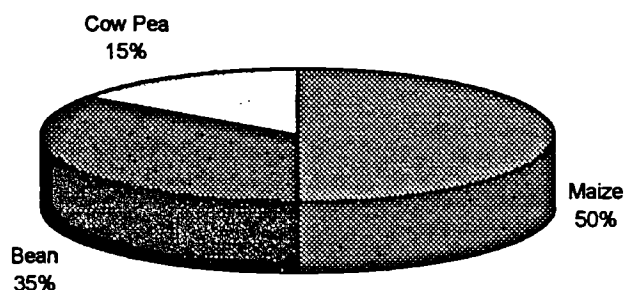


Figure 29. Output in Kenya Shillings for the 10 Lowest Households during the Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

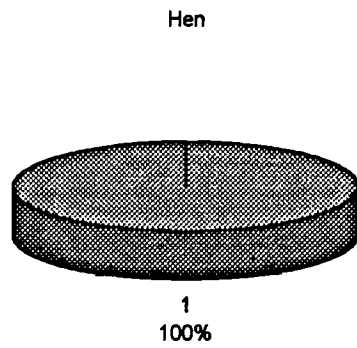


Figure 30. Output in Kenya Shillings for the 10 Lowest Households during the Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

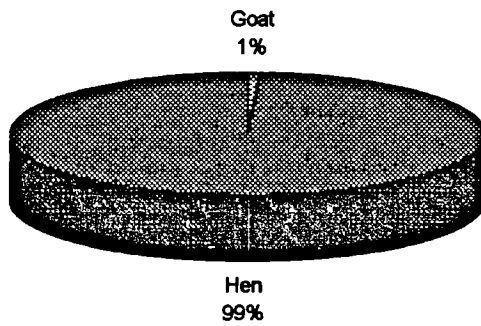


Figure 31. Input in Kenya Shillings for the 10 Highest Households during Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

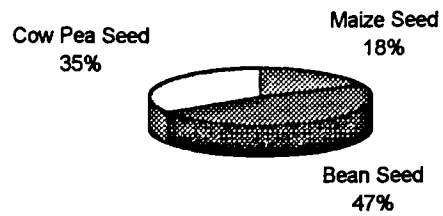


Figure 32. Input in Kenya Shillings for the 10 Highest Households during Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

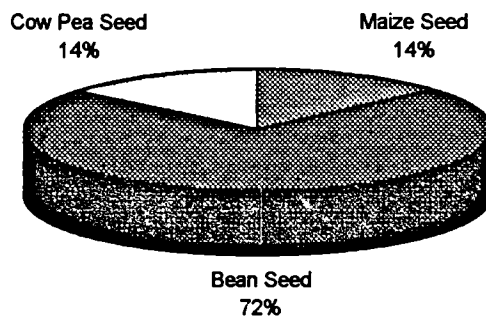




Figure 33. Input in Kenya Shillings for the 10 Highest Households during Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

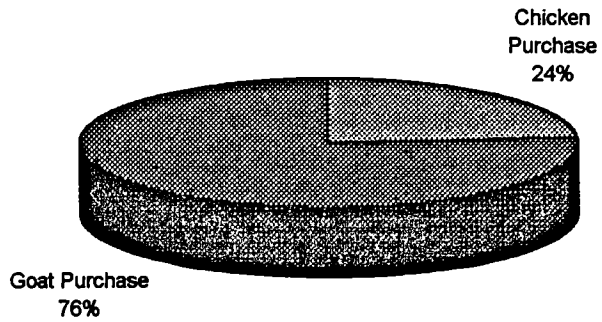


Figure 34. Input in Kenya Shillings for the 10 Highest Households during Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

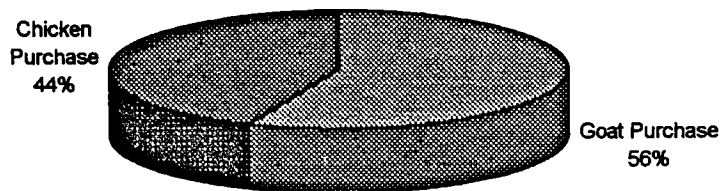


Figure 35. Input in Kenya Shillings for the 10 Medium Households during Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

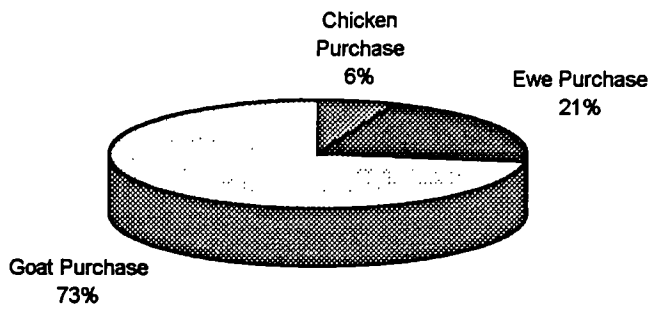


Figure 36. Input in Kenya Shillings for the for 10 Medium Households during Short Rain Season, Muuni Settlement Scheme, Makueni District, 1997/98.

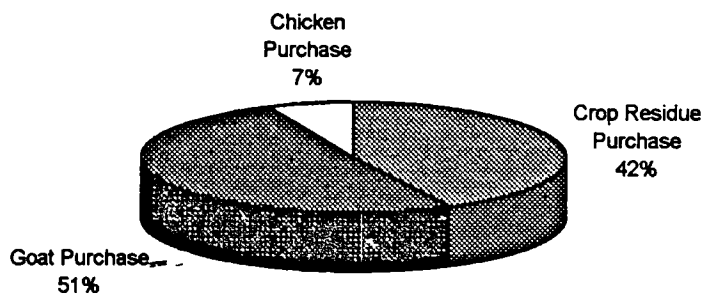


Figure 37. Input in Kenya Shillings for the 10 Lowest Households during Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

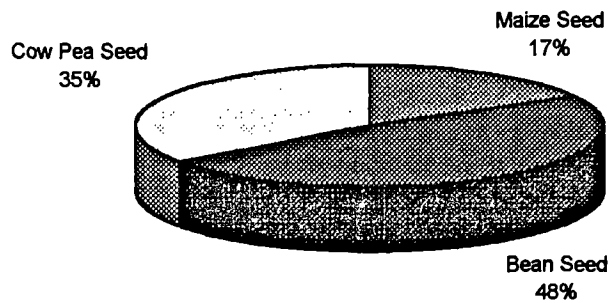


Figure 38. Input in Kenya Shillings for the 10 Lowest Households during Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

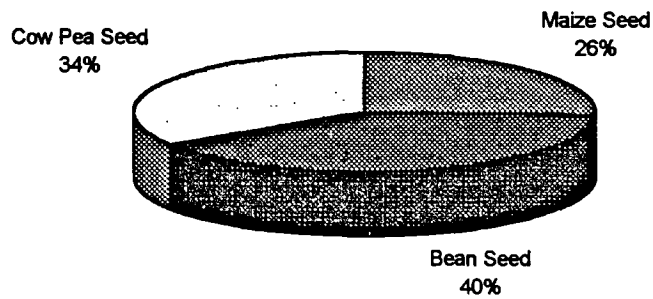


Figure 39. Input in Kenya Shillings for the 10 Lowest Households during Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

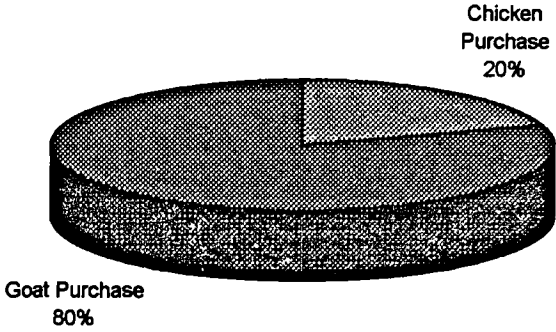


Figure 40. Input in Kenya Shillings for the 10 Medium Households during Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

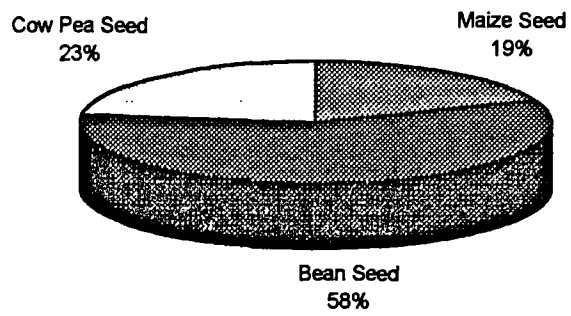


Table 57. Major variables Determining Farm Output During the Long Rain (April-June) Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

NO.	FARM CODE	LABOUR (h.)	PURCHASE (KSh) *	SOIL TYPE CODE	RAIN (mm)	OUTPUT (KSh)
1	01	1964	3551	0	48	16938
2	02	555	1485	1	40	3540
3	03	503	1372	1	48	9352
4	04	906	628	0	50	5216
5	05	?	?	?	?	?
6	06	2584	3285	0	52	11310
7	07	1136	2435	0	45	7730
8	08	446	684	1	41	8550
9	09	3193	2836	0	34	34360
10	10	330	1615	0	8	1340
11	11	653	908	0.5	12	4710
12	12	961	1199	1	32	15121
13	13	275	608	0	30	1260
14	14	?	?	?	?	?
15	15	430	3973	0.5	38	14465
16	16	808	2132	0.67	40	9410
17	17	482	4308	0	28	9950
18	18	468	5356	1	27	5470
19	19	658	4997	0	22	13850
20	20	248	810	0	28	1910
21	21	833	3935	0	15	6600
22	22	498	2493	0	23	24200
23	23	451	2561	0	42	11620
24	24	509	4307	0	37	16700
25	24	172	3230	0	27	1720
26	26	451	3089	0.33	22	1400
27	27	296	627	1	16	1610
28	28	993	3586	0.67	20	13599
29	29	335	1054	0	18	1580
30	30	3209	2988	0	26	3830

? No long rain records (substitute recorder following a dropout).

\* Purchase of all farming-related commodities.

Table 58. Major variables Determining Farm Output During the Short Rain (October-December) Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

NO.	FARM CODE	LABOUR (h)	PURCHASE (KSh)*	SOIL TYPE CODE	RAIN (mm)	OUTPUT (KSh)
1	01	2213	1938	0	755	22243
2	02	275	759	1	780	16818
3	03	421	2413	1	749	42965
4	04	1089	333	0	699	6430
5	05	333	4446	0.5	660	29730
6	06	2206	3649	0	709	18670
7	07	342	3310	0	704	36426
8	08	900	1805	1	563	16970
9	09	2693	3140	0	668	54204
10	10	331	2148	0	524	12630
11	11	567	4619	0.5	719	47541
12	12	1108	860	1	764	17035
13	13	71	821	0	980	10170
14	14	306	1201	0	568	108970
15	15	351	1621	0.5	648	13991
16	16	512	2463	0.67	1622	27300
17	17	413	2403	0	610	18715
18	18	182	710	1	646	25560
19	19	253	1860	0	474	59550
20	20	234	1209	0	614	12680
21	21	997	3388	0	1035	45400
22	22	337	3243	0	734	39590
23	23	342	2031	0	1488	5980
24	24	430	5156	0	698	25650
25	25	203	2898	0	708	21135
26	26	590	943	0.33	712	19620
27	27	232	1875	1	619	25960
28	28	872	1297	0.67	616	30696
29	29	412	687	0	800	13051
30	30	3354	3850	0	494	4520

\* Purchase of all farming-related commodities.

## 6.2. Analysis of Daily Farm Inputs and Outputs:

An hierarchical approach to the analysis of data was adopted for each season and for each farming unit that had kept satisfactory records. In the first step of the analysis, the total value of all goods and materials (total value of on-farm produce per season) was calculated using the standard prices shown in Tables 59 and 60. These prices were established by a survey of local markets at the time of the study. The items purchased were seeds, animals and forage for livestock. Likewise, the total value of outputs was calculated from the standard prices and the quantities of produce yielded during each season. These were grains, pulses, livestock, charcoal and fuel-wood and forage for livestock. The quantity of each material consumed by the household units were juxtaposed with the farm sales. Next the number of hours spent working on the farm were estimated as recorded by the sample householders. Included in this were labour supplied by the farmer and hours of hired labour for activities such as plowing, planting, weeding and harvesting.

The value of produce calculated in the way described above was related to the value of purchases, hours of labour and to two physical characteristics of the farm using multiple regression techniques.

The physical characteristics were rainfall during the season as recorded by the farmer and the soil type (Figure 3m). For the latter, dummy values were included in the model, with zero (0) representing red-sandy and one (1), black-sandy soils. In a few cases where a farm had both types of soil, a subjective estimate of the relative proportions of each was used to produce the necessary value. For example, a farm with red:black sandy soils in the ratio 1:2 was coded 0.33 and one with equal proportions 0.5 etc. Both selective stepwise multiple regression and regression in which all four variables were forced into the model were used, as explained in the results section below.



Table 59. Unit Value of Farm Purchases and Sales in Kenya Shillings for Long Rain Season (Season 1), Muuni Settlement Scheme, Makueni District, Kenya, 1997.

ITEMS	FARM PURCHASES SEASON 1 (KSh)		
	kg/Litre/Bag/Bundle	Cost/unit	Sale/unit
Maize seeds (kg)	17	15	
Bean seeds (kg)	70	60	
Cow peas seeds (kg)	40	20	
Green gram seeds (kg)	35	20	
Sorghum seeds (kg)	9	5	
Pigeon peas seeds (kg)	25	20	
F. millet seeds (kg)	40	30	
B. millet seeds (kg)	30	20	
Okra seeds (kg)	(1200)?	20	
Milk (l)	27	27	
Charcoal (Gunny bag)	70	80	
Fuel wood (Bundle)	15	20	

Table 60. Unit Value of Farm Purchases and Sales in Kenya Shillings for Short Rain Season (Season 2), Muuni Settlement Scheme, Makueni District, Kenya, 1997.

ITEMS	FARM PURCHASES SEASON 2 (KSh)		
	kg/Bags/Litre/Bundle	Cost/unit	Sale/unit
Maize seeds (kg)	15	8	
Bean seeds (kg)	60	30	
Cow peas seeds (kg)	20	15	
Green gram seeds (kg)	20	12	
Sorghum seeds (kg)	5	5	
Pigeon peas seeds (kg)	20	12	
F. millet seeds (kg)	30	20	
B. millet seeds (kg)	20	15	
Okra yield (kg)	-	10	
Milk yield (l)	20	27	
Charcoal (Gunny Bag)	100	130	
Fuel wood (Bundle)	20	20	

### 6.2.1. Analytical Results For Long Rain Season (April-June):

To study the contribution made by independent variables, all four were forced into the model. On inspecting the results it was found that one farmer had a very high standardised residual. Data for this unit (Farm Code 30) were removed as no confidence was attached to the accuracy of rainfall records for this farm for on occasions the recorder was found entering false data. Further, as only one farmer (Farm Code 22) had sold a bullock and as the value of this animal was high (KSh 8,000), the value of outputs for this farm was reduced by that amount. Further, two other farms were removed from the analysis (Farm Codes 5 and 14) because they did not record sufficient long rain data due to the fact that they were substitutes replacing dropouts.

The following results ensued:

$$\text{Outputs (KSh)} = -859 + 6.76 \text{ Labour (Hours)} + 1.38 \text{ Purchases (KSh)} + 1412 \text{ Soil Type} + 27.0 \text{ Rain (mm)}$$

$$S = 5311 \quad R^2 = 56.1\%$$

Predictor	Coefficient	Error	t-Ratio	P
Constant	-859	3504	-0.25	0.81
Labour	6.76	1.66	4.07	0.001
Purchases	1.38	0.75	1.83	0.08
Soil	1412	2579	0.55	0.59
Rain	27.0	92.6	0.29	0.77

At first sight the negative constant, though not statistically significant, appears strange, but it probably reflects the loss that a farmer would make if he failed to purchase items for the farm or worked on it! The importance of labour was identified and the statistical significance of purchases ( $P = 0.08$ ), which is close to the accepted critical value of 0.05 suggests that this factor may also be important. However, both of these factors may simply relate to farm size. Neither soil type nor total rainfall had any influence, but it should be noted that values for rainfall were low and it seems very possible that precipitation over the growing season was insufficient to have any influence on the yield. This matter is further considered below.

When stepwise multiple regression was used, the only variable significantly influencing the value of outputs was labour. The relationship was:

$$\begin{aligned}\text{Outputs (Ksh)} &= 3403 + 7.27 \text{ labour hours} \\ S &= 5357 \quad R^2 = 49.3\%\end{aligned}$$

It can be seen that labour alone explained about 50% of the variation of farm outputs and each extra hour spent working increased outputs by KSh 7.27.

### **6.2.2. Analytical Results For Short Rain Season (October-December):**

When stepwise multiple regression was used, the only variable significantly ( $P=0.006$ ) influencing the value of outputs was purchases whose relationship was:

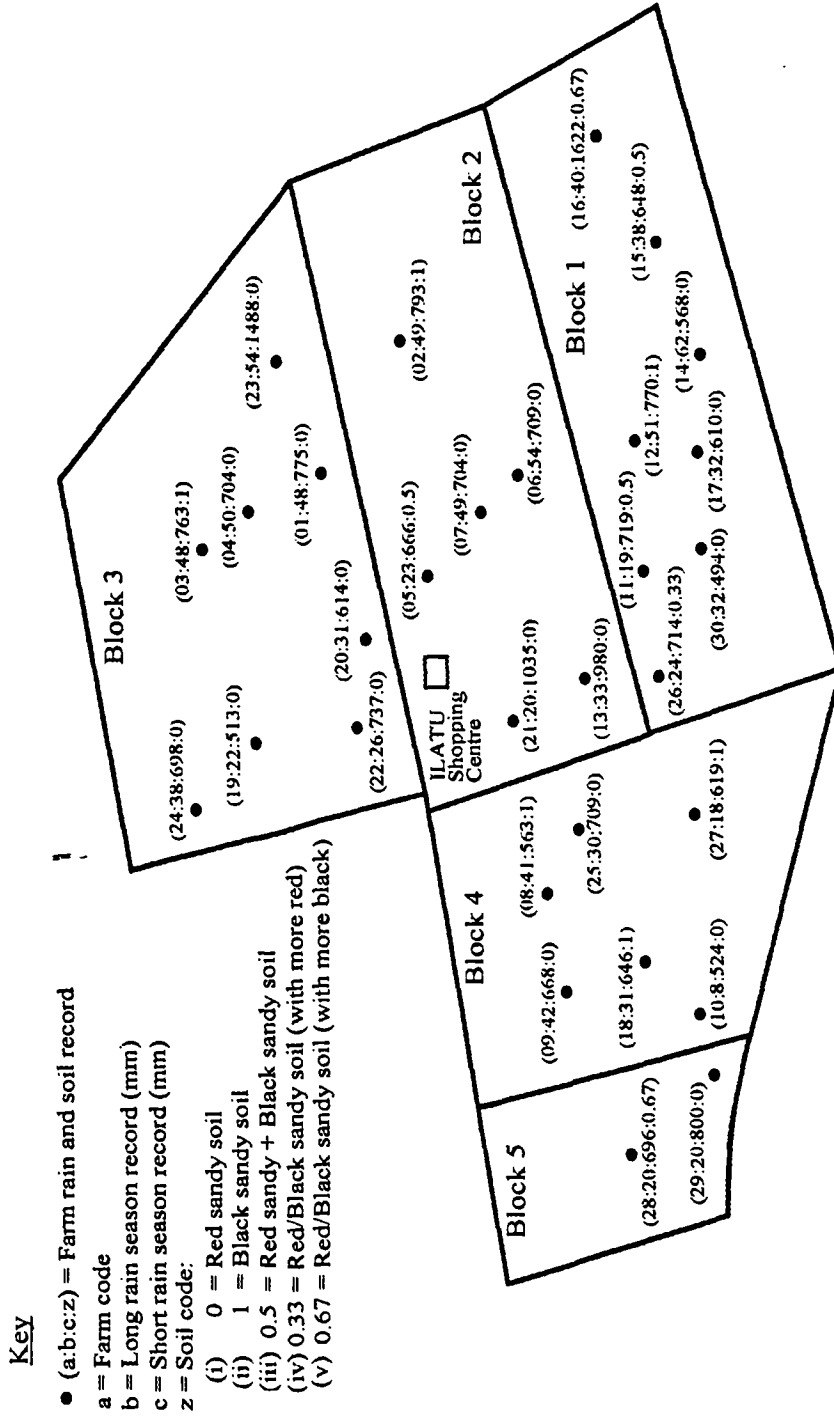
$$\begin{aligned}\text{Outputs (Ksh)} &= 12670 + 6.03 \text{ Purchase (KSh)} \\ S &= 12684 \quad R^2 = 26.8\%\end{aligned}$$

It can be seen that purchases alone explained 27% of the variation of farm outputs and each extra shilling spent buying increased outputs by KSh 6.03. Rain records of one farmer were excluded from the model for lack of credibility and reliability. He had recorded almost twice as much as others on average. Furthermore, in some cases, his entries were notoriously the same each day and I believe this would not have been the case. Other cases to be eliminated from this analysis were those of Farmer given code number 30 for the same reasons given for Season One (no confidence was attached to the accuracy of rainfall records for this farm), and Farm Codes 5 and 14. These last two were omitted to ensure that the same sample was used in both seasons.

The following results ensued:

$$\begin{aligned}\text{Outputs (KSh)} &= 20787 + 2.13 \text{ Labour (Hours)} + 6.41 \text{ Purchases (KSh)} + 5188 \text{ Soil} \\ &\text{Type} - 16.4 \text{ Rain (mm)} \\ S &= 12995 \quad R^2 = 35.4\%\end{aligned}$$

Figure 3m. Location of the Recording Households Showing Relative Rainfall (mm) and Soil Types during the Long and Short Rain Seasons, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Predictor	Coefficient	Error	t-Ratio	P
Constant	20787	12513	1.66	0.112
Labour	2.13	3.898	0.55	0.591
Purchases	6.41	2.186	2.93	0.008
Soil	5188	6567	0.79	0.438
Rain	-16.4	13.62	-1.20	0.243

Neither soil type nor total rainfall had any influence, but it should be noted that rainfall (P = 0.243) was the next most important factor influencing farm outputs in the second season although it did not attain a statistically significant level. Rainfall was unusually high and greater than normal for the area under study. This most likely was caused by the EL-NINO phenomenon that affected many parts of the world during that time. Values for rainfall were high and thus seem to contribute considerably towards crop yields, forage production etc. which in turn would be expected to influence the level of total outputs in a positive way.

### 6.2.3. Labour Predictors For Long Rain Season:

Since labour proved to be an important factor influencing farm production in this settlement scheme (Rocheleau, 1995), it meant that the more labour-hours input one employed the higher the farm outputs. It was then necessary to consider possible important variables that influenced labour hours within this community.

As shown in Table 61, of all possible predictors of labour the following factors were considered to be important:

1. Size (number of working persons, excluding the farmer)
2. Age in years of the householder
3. Education (standard level attained) of the householder
4. Hired labour (KSh)
5. Group affiliation (dummy variables, 1=Yes, 0=No)
6. Acreage put under cultivation
7. Morbidity months
8. Number of children (excluding married daughters) in employment or wage earning
9. Household marital status (dummy variables, 1=couple, 0=single)
10. Presence of cattle (dummy variables, 1=presence, 0=absence)
11. Presence of sheep and goats (dummy variables: 1=presence, 0=absence)

Table 61. Labour Predictors During Long Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

NO.	FARM CODE	LABOUR INPUT (HR)	HOUSE-HOLD SIZE	HOUSE HEAD AGE	HOUSE HEAD EDUCATION	HOUSE LABOUR (KSH)	GROUP AFFILIATION	TILLED ACRES	MORBID MONTHS	WAGE EARNING CHILDREN	ONE OR MANY WIVES	CATTLE OWNERSHIP	GOAT OWNERSHIP	SHEEP OWNERSHIP
1	01	1964	2	28	7	4525	1	2.01	0	0	1	0	1	0
2	02	555	5	45	5	0	1	3.44	0.5	0	1	0	1	0
3	03	503	5	60	0	0	0	3.49	0	2	0	0	1	0
4	04	906	0	68	2	0	1	1.78	1	2	1	0	1	0
5	06	2584	3	28	8	338	1	3.67	4	0	1	1	1	0
6	07	1136	5	46	2	0	1	3.27	0	0	1	0	1	0
7	08	446	3	60	4	0	1	1.41	0	1	0	0	0	0
8	09	3193	6	49	11	0	0	4.9	0	0	1	1	1	0
9	10	330	5	42	7	0	0	1.74	2	0	0	0	1	0
10	11	653	4	69	4	0	1	2.43	0	2	1	0	1	0
11	12	961	7	48	9	900	1	2.17	0	1	1	0	1	0
12	13	275	6	53	1	0	1	0.55	0	0	0	0	0	0
13	15	430	1	48	7	0	0	2.53	0	0	0	0	1	0
14	16	808	4	28	7	900	0	1.79	3	0	1	1	1	1
15	17	482	5	48	0	0	0	2.48	0	0	1	1	1	0

Table 61. Cont'd.

16	18	468	4	55	4	0	0	0	5.49	1	1	0	0	0	0
17	19	658	6	45	4	0	1	1	6.79	4	0	0	0	1	0
18	20	248	5	42	7	0	0	0	1.8	0	1	0	0	0	0
19	21	833	0	28	5	0	1	1	2.43	1	0	1	0	1	0
20	22	498	2	33	12	0	1	1	3.41	3	0	1	0	1	0
21	23	451	1	41	7	0	0	0	3.22	0	0	0	0	1	0
22	24	509	8	45	12	0	0	0	4.25	0	1	0	0	1	1
23	25	172	3	41	7	0	0	0	3	0	0	1	0	0	0
24	26	451	1	53	3	0	1	1	3.88	0	4	0	0	1	0
25	27	296	1	68	0	0	1	1	2.4	2	1	1	1	1	1
26	28	993	11	49	2	0	1	1	4	1	3	1	1	1	0
27	29	335	1	44	0	0	1	1	1.78	3	0	0	0	1	0
28	30	3209	4	62	8	0	1	1	3.42	1	0	1	1	1	0

All the above factors were put into regression models to find out which ones influenced labour most. For these analyses, values for Farm Code 30 were included as there was no reason to question the records for the variables under consideration, only rainfall being suspect. When stepwise multiple regression was used, three out of the eleven independent variables entering the model were found to be significant factors influencing labour in the scheme. These variables, put in order of their importance were presence of cattle (P=0.000), householder's education level (P=0.004) and group affiliation (P=0.038). The relationship was:

$$\text{Labour (h)} = -275 + 107 \text{ House Holder's level of Education} + 529 \text{ Group affiliation} + 1074 \text{ Presence of cattle.}$$

$$S = 601.3 \quad R^2 = 54\%$$

Predictor	Standard		t-Ratio	P
	Coeff.	Error		
Constant	-275	287	-0.96	0.348
Hse. Head Educ.	107.21	33.39	3.21	0.004
Group affiliation	528.5	240.6	2.2	0.038
Cattle presence	1073.7	262.7	4.09	0.000

The negative constant (-275) most likely indicates the forgone opportunity cost in terms of hours if the farmer did not put into consideration the three labour predictors shown above. The three variables, presence of cattle, house holder's education and being member of a social group alone explained 54% of the variation of farm labour inputs and for each extra head of cattle owned by the householder, each extra level of education and being member of a social working group would increase farm labour hours by 1074, 107 and 529, respectively.

To study the contribution made by all eleven independent variables, they were forced into a model with the following regression results:



Predictor	Coeff.	Error	t-Ratio	P
Constant	-1024.4	837	-1.22	0.239
Hse. Hold size	-35.99	50.45	-0.71	0.486
Hse. Hold head age	10.71	14.11	0.76	0.459
Hse. Hold head educ.	95.3	39.18	2.43	0.027
Hired labour (KSh)	0.2359	0.1573	1.5	0.153
Group affiliation	687.6	317.8	2.16	0.046
Tilled acreage	180.4	100.9	1.79	0.093
Sickness months	-190.3	125.6	-1.52	0.149
Earning children	-197.8	135.1	-1.46	0.163
Marital status	-195.1	335.7	-0.58	0.569
Cattle presence	1292.1	372.4	3.47	0.003
Shoat presence	149.8	337.2	0.44	0.663

Except the householder's level of education, his/her affiliation to a social working group and having cattle on the farm, none of the other variables had any significant influence on farm labour hour input although size of cultivated area in acres had a considerable influence ( $P=0.093$ ) and ranked fourth among others.

As the above three variables appear to influence labour hours and as labour seems to be the factor having most bearing on output in this season, it was expected that they would be related to output. This was tested by use of stepwise regression, which employed all eleven independent variables and the dependent variable 'output' (see Table 57). In this instance the only significant predictor was Education, the equation being:

$$\text{Outputs (KSh)} = 3217 + 1098 \text{ Education Level}$$

$$S = 6274 \quad R^2 = 29.0\%, \text{ significant at } P = 0.003.$$

#### 6.2.4. Purchases Predictors For Short Rain Season:

Since purchases proved to be an important factor influencing farm production in this settlement scheme, during the second season, it meant that the more money (KSh) used in purchasing items of farm input, the higher the farm outputs would be. It was then necessary to consider possible important variables that would determine common purchases of farm input within this community. Of all possible purchases predictors shown in Table 62, the following were considered to be important items of purchase:

1. Number of goats
2. Number of sheep
3. Number of chicken
4. Bundles of forage
5. Bundles of fuelwood
6. Kilograms of Maize seeds
7. Kilograms of Bean seeds
8. Kilograms of Cow pea seeds
9. Kilograms of Green gram seeds
10. Kilograms of Sorghum seeds
11. Kilograms of Bulrush millet seeds

Table 62. Purchase Predictors During Short Rain Season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

No.	FARM CODE	Purchase (KSh)	Goats (KSh)	Chicken (KSh)	Farm Chemical (KSh)	Maize Seed (KSh)	Bean Seed (KSh)	Cow Pea Seed (KSh)	Green Gram Seed (KSh)	Sorghum Seed (KSh)	Finger Millet Seed (KSh)
1	01	1938	0	0	0	420	1380	115	20	3	0
2	02	759	0	0	0	480	276	0	0	3	0
3	03	2413	0	0	0	780	690	920	20	3	0
4	04	333	0	0	0	90	0	230	10	3	0
5	06	3649	0	0	0	600	2760	230	12	12	0
6	07	3310	0	0	0	540	1380	230	10	12	35
7	08	1805	0	0	0	540	1035	230	0	0	18
8	09	3140	0	0	0	600	2415	115	10	0	0
9	10	2148	0	0	0	300	690	1150	8	0	0
10	11	4619	0	0	0	810	3450	345	8	6	0
11	12	860	0	0	0	180	345	322	10	3	0
12	13	821	0	0	0	120	345	345	8	3	0
13	15	1621	0	0	0	300	345	345	8	3	0
14	16	2463	0	0	0	840	1380	230	10	3	0
15	17	2403	0	0	200	450	1380	460	10	3	0
16	18	710	0	0	0	480	0	230	0	0	0
17	19	1860	0	100	0	360	0	1380	120	0	0
18	20	1209	0	0	0	270	690	230	12	7	0
19	21	3388	0	0	0	264	3036	88	0	0	0
20	22	3243	0	0	0	240	2760	230	10	3	0
21	23	2031	0	0	0	240	0	460	8	3	0
22	24	5156	0	0	0	240	1380	460	0	6	0
23	25	2898	1100	220	0	360	2070	345	0	3	0
24	26	943	1100	1610	360	480	345	115	0	3	0
25	27	1875	0	120	0	360	1380	115	0	3	17
26	28	1297	0	0	0	480	345	460	10	2	0
27	29	687	0	0	0	240	345	92	8	2	0

Little can be learned from regression analysis above that apparent from Table 62. When stepwise multiple regression was used, six out of the nine independent variables were found to be significant factors of purchases in the scheme. These were beans, cow peas, goats, maize, chickens and sorghum, all significant at  $P= 0.001$  or better. From the table it can be seen that these were the major costs and it is not surprising that the regression equation linking the above six independent variables to 'Purchases' explained 98% of the sum of squares of variation.

### **6.3. Rain Distribution in Relation to Crop Yields:**

To establish how rainfall pattern and distribution within the Muuni settlement scheme affected farm crop production among households, daily rainfall records during the growing seasons were considered. The normal long rain growing season usually starts at the beginning of April through to the end of June. The short rain growing season starts at the beginning of October through to the end of December.

Unfortunately, it was not possible for the study sample households to start recording the 1997 long rains until May 14, the date when all rain gauges were conveniently set to begin recording. Non-demonic but unavoidable time and spatial intrusions were the reasons behind this failure to act in a timely fashion. This was so because logistics used to buy rain gauges in Kenya were futile due to unaffordable price. The only other place to obtain them was the far off Britain. This process took time and hence the delay in timely recording. However, it was known that farmers sowed seed at about the same time, namely in first few days of April, so it was assumed that time of sowing would not complicate the relationship between rainfall and crop yield.

#### **6.3.1. Rainfall Distribution in Relation to Maize and Cow Peas Yields During the Long Rain Season:**

Yields of two important crops, maize and cow peas, were considered because they were the only two crops every farmer planted throughout the study area. About 75-90 days are considered to be the growing season for maize depending on the variety of seed planted. Although the first one and a half months of growing season (April 1 to May 13) were missed with respect to rainfall records, attempts were

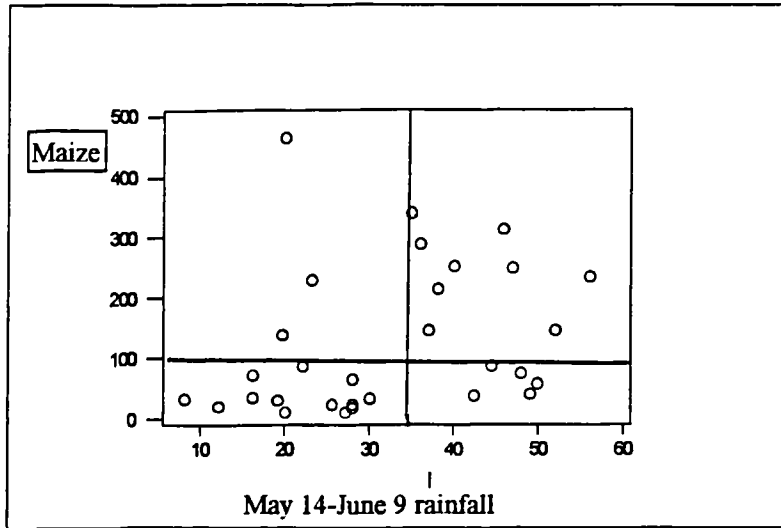
nevertheless made to see the effects of the first 27, second 26 and third 26 days of rain on maize and cow peas yield per acre. These days were between May 14-June 9, June 10-July 5 and July 6-31, respectively.

**Maize:**

If maize yield per acre was 100 kg or less, this was considered 'low' and if higher than 100 kg this was considered 'high' yield. If rainfall was 35 mm or less, this was considered 'low' but 'high' if above that.

Figure 3a. shows the scatter graph of maize yield against the first 27 days of recorded rainfall.

Figure 3a. The First Monthly Rainfall in millimetres (May 14-June 9) in Relation to Maize Yield (kg/acre). Muuni Settlement, Makueni District, Kenya, 1997.



The chi-square analysis for maize yield in relation to the first recording period is shown below.

May 14-June 9 rainfall:

#### Chi-Square Test

	column 1	column 2	Total
1	12	5	17
	9.38	7.62	
2	4	8	12
	6.62	5.38	
Total	16	13	29

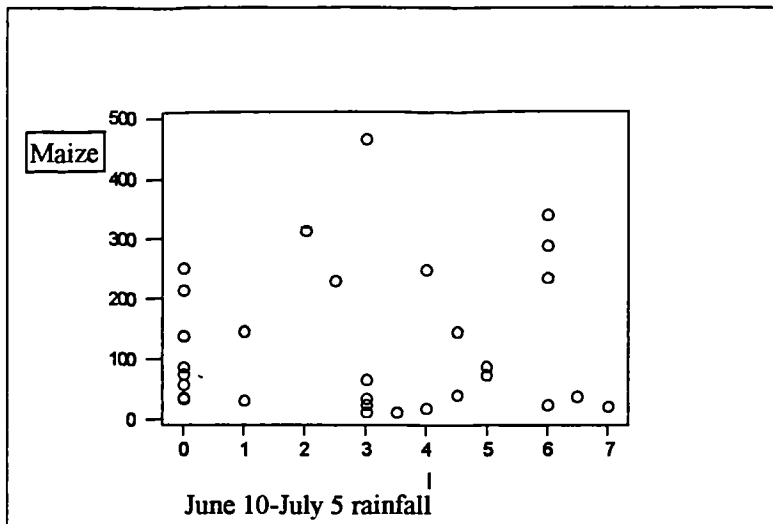
$$\text{Chisq} = 0.732 + 0.901 + 1.037 + 1.277 = 3.948$$

$$\text{df} = 1, p = 0.047$$

It can be seen that there is a clear association between rainfall in this period and yield, such that those farms that recorded low rainfalls also had poor yields and vice versa.

June 10-July 5 rainfall:

Figure 3b. The Second Monthly Rainfall in millimetres (June 10-July 5) in Relation to Maize Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.



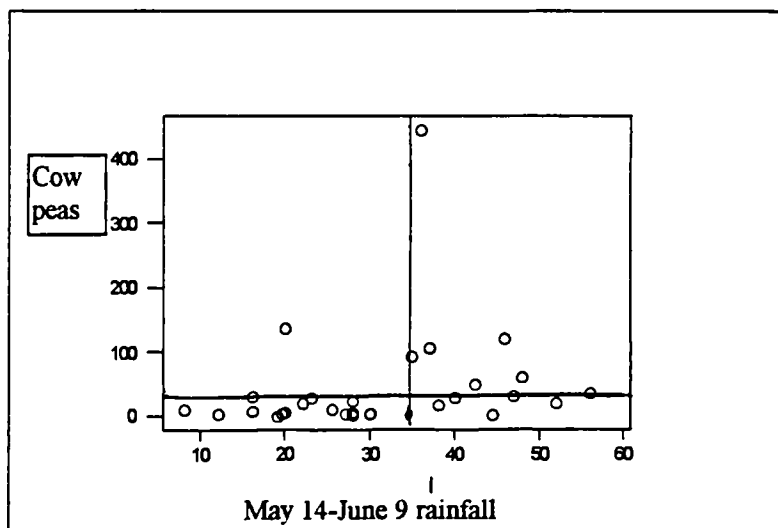
With respect to the second and third rainfall periods, chi-square analysis was more difficult or impossible. Thus in the second period, the range of rainfall lay only between zero and 7 mm and it seems unlikely that such small differences could influence yield. However, chi-square analysis of the data shown in figure 3b was attempted, critical rainfall set at 3.5 mm. No significant effects detected. Regarding the third period, the situation was even more difficult and not amenable to analysis as only two farms recorded any precipitation. No further analysis was made.

#### Cow Peas:

If cow pea yield per acre was 35 kg or less, this was considered 'low' and if higher than 35 kilograms this was considered 'high' yield. If rainfall in the first period was 35 mm or less, this was considered 'low' but 'high' if above that. Chi-square analysis for cow peas yield in relation to the first 27 days was carried out on the data shown in the scatter graph (figure 3c.).

May 14-June 9 rainfall:

Figure 3c. First Monthly Rainfall in millimetres (May 14-June 9) in Relation to Cow Peas Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.



#### Chi-Square Test

	<u>column 1</u>	<u>column 2</u>	<u>Total</u>
1	14	3	17
	10.93	6.07	
2	4	8	11
	7.07	3.93	
Total	18	10	28

$$\text{Chisq} = 0.863 + 1.554 + 1.334 + 2.401 = 6.152$$

$$\text{df} = 1, p = 0.013$$

Once again the importance of early rainfall on yield was detected and farms suffering low rainfall recorded lower yields.

As for maize, corresponding analysis for the second and third rainfall periods were hampered by the lack of variability in rainfall and for cow peas no significant results were obtained.



### **6.3.2. Rainfall Distribution in Relation to Maize and Cow Peas Yields During Short Rain Season:**

The 1997 short rain season was characterized by an abnormal rainfall pattern which distorted the usual land preparation, planting, weeding, and harvesting sub-seasons. Thus some farmers did not bother to plant at the usual time as they could see that there was plenty of soil moisture and they could delay sowing without expecting a reduction in yield.

As shown in the six scatter graphs (figures 3d to 3i) no clear cut pattern of yields could be identified and confidently related to rain since all the three growing months (October 1-December 31) received heavy rainfall continuously which is not usually the case.

As shown in figures 3g and 3h, both maize and cow peas seem to have attained their maximum yields at 50 mm of rain during the early period (October 1-31). This would probably mean that any rain in excess of 50 mm during November and December months would not be necessarily needed for yield optimization under a normal rain pattern for this area. As shown by the figures, there seem to be potential for raising yields on a per acre basis if the rainfall consistently remains high during every phase of growth.

In consequence, it appears that rainfall was not a factor limiting crop yield. Indeed, there is a little evidence that those farms experiencing the highest precipitation suffered losses due to water-logged conditions and other emergent problems associated with crop curing, molding and decaying.

Figure 3d. The First Monthly Rainfall in millimetres (October 1-October 31) in Relation to Maize Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.

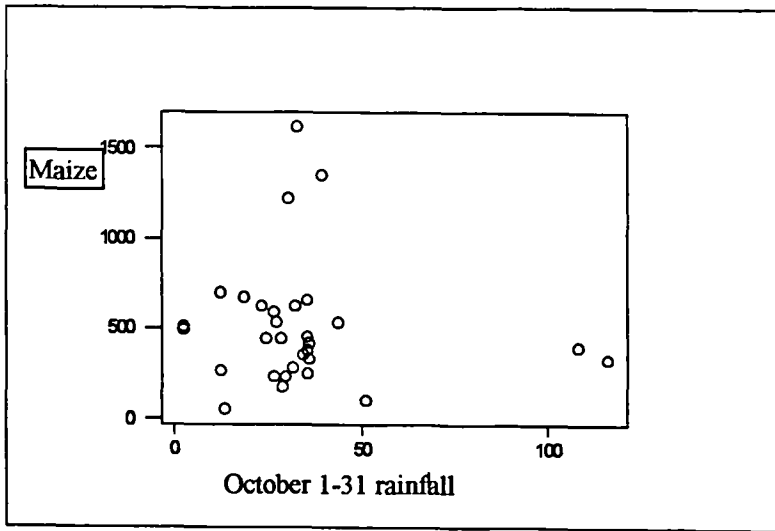


Figure 3e. The Second Monthly Rainfall in millimetres (November 1-November 30) in Relation to Maize Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.

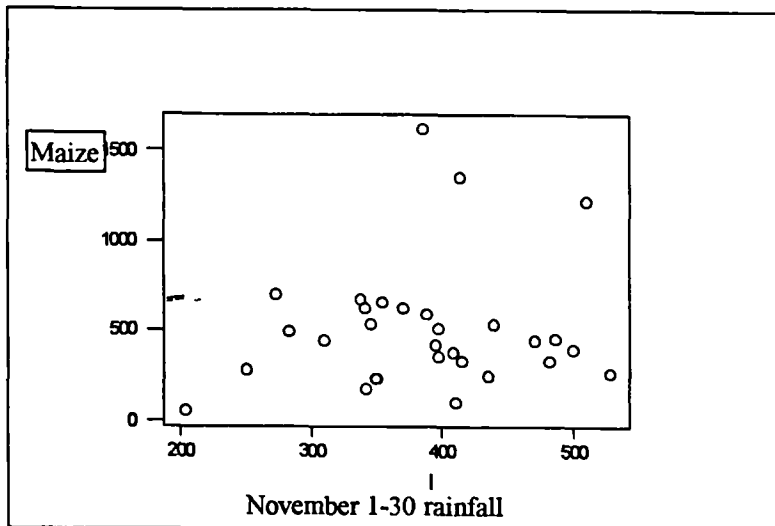


Figure 3f. The Third Monthly Rainfall in millimetres (December 1-December 31) in Relation to Maize Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.

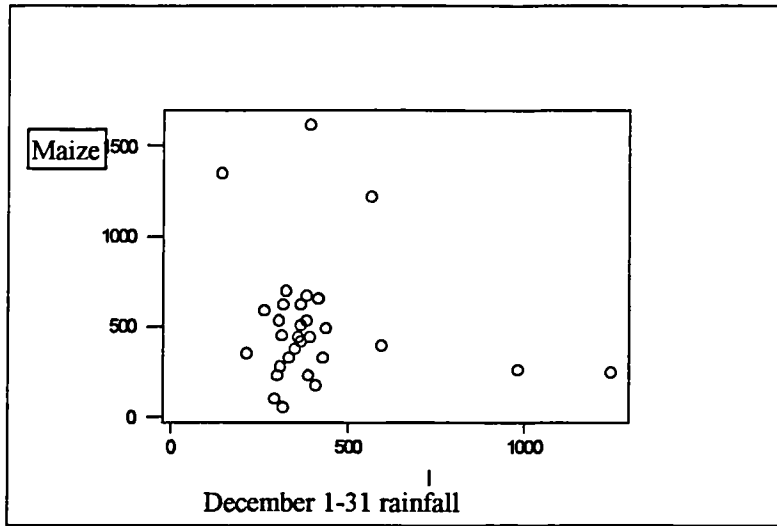


Figure 3g. The First Monthly Rainfall in millimetres (October 1-October 31) in Relation to Cow Peas Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.

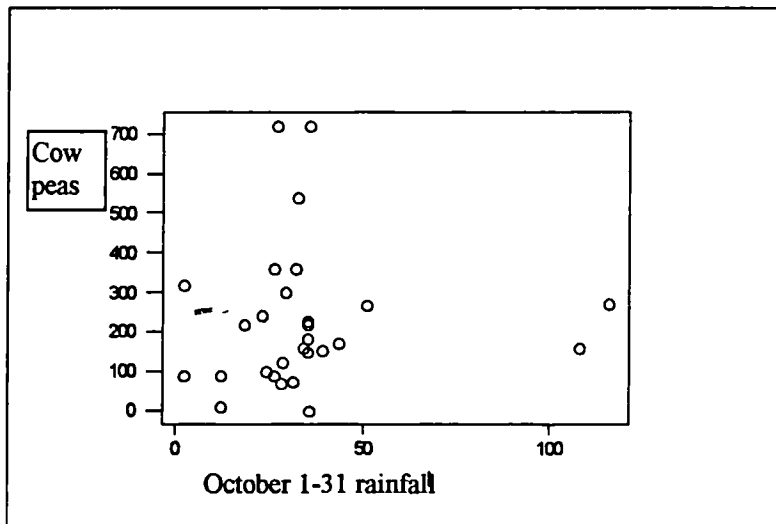


Figure 3h. The Second Monthly Rainfall in millimetres (November 1-November 30) in Relation to Cow Peas Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.

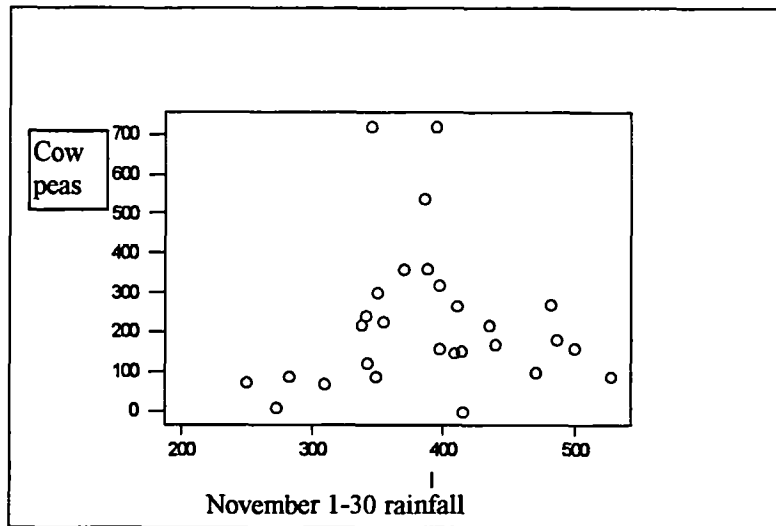
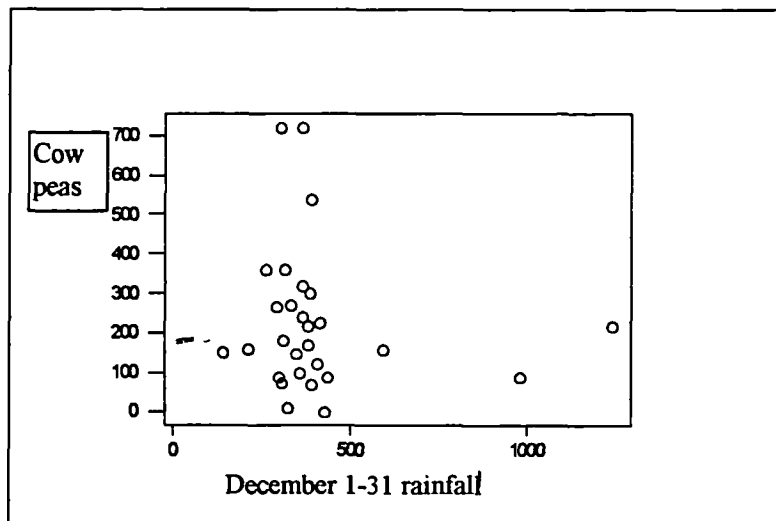


Figure 3i. The Third Monthly Rainfall in millimetres (December 1-December 31) in Relation to Cow Peas Yield (kg/acre). Muuni Settlement Scheme, Makueni District, Kenya, 1997.



**6.4. Farm Production Analytical Summaries:**

- In view of the foregoing analyses, the following observations are worth noting. It should be remembered that at Muuni, all holdings are of the same size, though the soil type is not the same throughout and rainfall, as recorded by the farmers,

showed considerable variation over the area. Also, the size of families living on each holding, their age structure, educational standard and state of health varied from unit to unit (Appendices 22 and 23).

- With regard to the value of produce, there are in general terms, many factors that are likely to determine this, including those mentioned in the previous paragraph. Thus soil type, rainfall and the availability of labour to tend the crops and animals all have a bearing. To these must be added the capacity of the farmers to make purchases of seed, agro-chemicals, implements and livestock for it is accepted fact that, all things being equal, the more that is put into a farming system, the more will come out. It was with these thoughts in mind that the data on farms inputs and outputs in each season was analyzed (Friedrich, 1977).
- Firstly, information on rainfall was taken into account. Unfortunately, though on-farm recording commenced in February 1997, it was not until mid-May that rainfall recording was started. This is unfortunate, given that early rainfall is likely to significantly influence the establishment of crops sown in the first few weeks of April, the usual start of the long rains. Necessity forced the use of rainfall data after the 14th. May; preference would have been the 1st. April. No such problem applied to the short rains where full data were available. Further, it must be pointed out that the two seasons studied were atypical. The long rain season (April-June) was uncharacteristically dry and the short season (October-December) was phenomenally wet with record mean of 745 mm in three months. Given that the long-term annual mean for the area is 595 mm (Jaetzold, 1983), then it is justified to say that the season was characterized by demonic intrusions.
- The great variation in rainfall figures, as reported by the farmers in each season should be noted. In the long rains it was from as little as 8 mm to as much as 62 mm; in the short rains from 882 mm to 2450 mm, though the last figures was rejected as being impossibly high. Even though the farms were spread over only a few kilometres, it appears that sizeable differences in received precipitation are possible and suggest that particular farms may be in particularly rainy places, perhaps a consequence of very local topography. In an attempt to check on this possibility, rainfall data in each season were correlated for those units that had plausible values. The correlation coefficient for the 29 pairs used ( $r = 0.152$ ) failed

to reach statistical significance, so it seems that there is little hope of being able to predict what rainfall will be at each farming unit.

- Secondly, soil type was considered on the only basis possible at the time, namely soil colour, as nothing was known about the fertility of soils in the Muuni scheme.
- Thirdly, labour was accounted for, being the number of hours committed to farm work from all sources. Initially only the quantity of labour was considered, aspects of quality at a second stage.
- Finally, purchases of all kinds were evaluated on the basis of cost, then all four factors were linked to the value of products through linear regression.
- In the long rains, the only factor attaining statistical significance was labour ( $P=0.001$ ), though purchases were close to the accepted significant value of 0.05 at 0.071. It might be concluded from this that soil and rainfall have no influence on farm outputs at Muuni, but clearly care is needed when interpreting such a bold statement. Thus all that can confidently be stated is that the study provided no evidence of a difference in fertility between red and black sandy soil that had a bearing on farm income. Detailed study of soil physical and chemical characteristic might well reveal differences between the two types, but the expectation is that any differences detected would not have an influence on fertility and consequently on crop production and farm income. On rainfall the situation is even more contentious, for it goes without saying that in Africa in particular, variations in the quantity and timing of rain have huge influences on crop and livestock production. All that this study shows is that total rainfall seems not to have affected total farm output in the long rains. But included in total farm output are the values of livestock, fuelwood and charcoal, which are less likely to have been influenced by rainfall.
- Returning to the matter of labour, it should be noted that this term was found significant only for the long rains, not so for the short rains. Given its importance, at least for the long rains, attempts were made to describe and analyze it in terms of household structure (numbers of persons, ages, health status and wage earners, the demand for labour (acres cultivated, livestock ownership pattern) and such factors as the use made of hired labour, participation in group activities and the educational standard of the head of the household. Of these, educational level

proved to be strikingly important. If this is true in general, then there are important lessons to be learned. It seems entirely plausible that the better educated are better placed to embark on money-earning activities, including farming, than those of lower educational standing. Also, a good education may well provide a better understanding of the basis of agricultural practices, open the door to current advice and information on improved practices (the capacity to read and understand advisory literature), and underpin logical thinking on the management of resources. In short, a well educated household head equips the family to work longer hours more effectively.

- Something of a dilemma is presented by the failure of the short rain data to support the idea that education is important, but there could be an explanation for this, connected with the weather conditions prevailing in the two seasons. The 1997 long rain did not come up to expectations; in contrast the short rains were exceptionally heavy (see Tables 57 and 58). It may be that education is important when conditions are difficult, a keen, developed mind being most useful when crop and livestock production is at risk. When there is plenty of rain, any body can grow a crop!
- Group membership and cattle ownership were also significant factors influencing labour-hours worked in the long rains and are easily understood. Thus membership of a group confers the right to call on other members for help on the farm and cattle have high labour demand.
- The more that was spent on making purchases in the short rains, which were heavy and yields good, the greater the farm output. Yet in the long rains this factor did not attain statistical significance, and no further analysis was undertaken of this factor for this season. In the long rains yields were poor and one interpretation for the lack of association is that purchases of agricultural commodities, be they large or small, had little impact on output, which was markedly influenced by rainfall. For the short rains, purchases of expensive items such as goats and expensive seed (beans) have most influence on total costs, an obvious finding. In turn it has been shown that output was positively linked to the value of purchases, as would be expected.

- On the matter of rainfall and crop yields, studies were made of the effects on the two crops universally grown in the project area, maize and cow peas. As has been mentioned, the short rains were marked by heavy falls throughout and it was not possible to find any association between rainfall and yield, except a possible deleterious effect of very heavy rain at two farms which had much rain and poor yields (Figures 3d. and 3g.).
- In the long rains, lack of information in the period April 1<sup>st</sup> to May 14<sup>th</sup> hampered analysis, but as shown in Figures 3a. and 3c. and the associated chi-square analyses, there is good evidence that early rain is important to yield. This finding was not unexpected. Lack of rain in the final stages of the season prevented investigations of its effects from being studied.

### **6.5. Conclusions:**

- ◆ The foregoing chapter helps us to appreciate the importance of the role crop growing plays within semi-arid area of Kenya and the analytical and technical aspects that significantly contribute to farm output in general and under Muuni conditions in particular. Such aspects are shown below:
- Farm labour input is a significant factor (0.001) contributing to farm output for Muuni community and indeed those who work harder ensure food security for their households.
- There is a significant evidence (0.004) that good education is vital in exploiting food security opportunities pertinent to semi-arid conditions.
- Membership of a community group contributes significantly (0.038) for it enables members to call others for help, as well as committing them to the obligation of helping others too.
- There is significant evidence (0.000.....) that keeping cattle entails extremely hard labour. Of course there is a payoff in the end but if people want less strenuous life, they should not attempt to keep cattle under Muuni conditions.
- Purchase of farm inputs such as seeds for planting and livestock as beans, cow peas, Maize, sorghum and goats and chicken was established to be highly significant (at the level of 0.001 or better) during the second rain season.



## **CHAPTER 7.**

### **INFORMATION TRIANGULATION BY USE OF CASE STUDIES:**

#### **7.1. Introduction:**

In this chapter, 30 case histories are used to triangulate the information given by focus group discussants and single subject interviewees. The chapter also relates to the analysis of the farm input/output and rainfall data recorded by farmers themselves in the course of the study reported in Chapter 6. Further, information given in this chapter will improve our understanding of how people go about restoring their disrupted social systems and thus help us see how existing social change models developed by social anthropologists, such as Thayer Scudder fit in. Tables used to summarize information from these 30 case histories are shown in the Appendix 1a to 15b. The 30 case history studies include 20 men and 10 women. Half of each group originates from the Chyulu Hills whereas the other half originates from the Kalembwani area.

The procedure used to describe case study responses is in a “Question/Answer” form in order to facilitate reference to the Appendices (Appendix 1a to 15b).

#### **7.2. Main Inquiries and Leading Questions:**

The main inquiries aim at understanding the past, the present and the perceived future situation of Muuni settlers are listed below:

1. Situation of the people prior to resettlement
2. Period of residence in the previous settlement
3. The ancestral dwellings before previous settlement areas
4. Becoming aware of the shift
5. Process of acquiring new land
6. Land use plan at Muuni
7. Description of work activities
8. Shopping and marketing
9. Neighbour relationship
10. Family relationship
11. Village leadership
12. Religious affiliation
13. Self-help group affiliation
14. External aid assistance
15. Life and future of Muuni

Leading questions for each of these major inquiries were developed in order to extract the required information from the respondents. This was necessary given the size of the sample and the time/budgetary constraints both for the respondents and for the inquirer. Appendix 1a. to 15b. gives the summary of responses in percentages.

### **7.2.1. Situation Prior to Muuni Residence:**

The situation prior to Muuni residence was considered depending on where people had settled before coming to Muuni. Generally, the respondents indicated that, they were better off in every aspect, namely family, livestock and relations with neighbours.

#### **7.2.1.1. How was family Situation Prior to Relocation?**

As shown in the Appendix 1a. and 1b. the majority of the respondents, both men and women indicated that they led a happier life in their previous settlement areas. This was due to plentiful food and less incidence of disease. This response was given by 80% of the men and 100% of the women from Chyulu and 90% and 100% for Kalemwani men and women, respectively. This response agrees quite well with the focus group discussants (FGD).

#### **7.2.1.2. How was the Livestock Situation Before Relocation?**

People owned varying numbers of livestock in Chyulu and in Kalemwani. However, in Chyulu and Kalemwani the livestock were said to be healthier due to adequate forage and less disease incidences.

#### **7.2.1.3. How were Neighbours' Relations Prior to Relocation?**

Neighbours relations were said to be very good by the majority of the respondents. This response was received from 70% of the men and 60% of the women from Chyulu; and 90% and 100% for Kalemwani men and women, respectively. Once again these responses agree reasonably well with those made by focus group discussants (FGD) described in Chapter 4.

### **7.2.2. Period of Residence in the Previous Settlement:**

The majority of the respondents who originated from Chyulu Hills indicated that they lived there from the early 1970s to the early 1990s, a period of about 20 years (Appendix 2a.). However, those who originated from Kalembwani said they had settled there at different times periods, with considerable percentage, 40% for men and 20% for women indicating living there from early 1950s to the early 1990s, a period of 40 years as shown in Appendix 2b.

### **7.2.3. Ancestral Dwelling Areas:**

The majority of Chyulu men and all women (90% and 100%, respectively) indicated that their ancestral areas before settling in the Chyulu Hills were within the mid-Machakos District zone which is nowadays within upper Makueni District (Appendix 3a.). Likewise, the majority of men and women who originated from Kalembwani (90% and 80%, respectively) indicated the same ancestral zone but specifically from Mukaa area (Appendix 3b.).

### **7.2.4. Becoming Aware of the Shift to Muuni Settlement Scheme:**

Generally, the shift warning was communicated to people by the government administration in early 1990s. However, there seems to be much variation in the way the Chyulu and Kalembwani people were made aware of the shift. Also there were variations in the time taken for pre-shift preparation between Chyulu and Kalembwani people. Plans made to make shifting possible included the sale of livestock, the hiring of rooms to settle the family while clearing bush and building new homes. The majority of the respondents indicated that they did not expect to find anything at Muuni except virgin land. There was a general agreement that all family members moved together either direct to Muuni or to towns near the settlement scheme. Everybody either lost, left behind or forfeited some personal property during the shift pandemonium as is shown below.

#### **7.2.4.1. When and How was the Shift Awareness Alerted?**

There was a greater variation in the way Chyulu respondents, both men and women, responded to this inquiry than there was for Kalembwani respondents. Whereas Chyulu respondents mentioned becoming aware of the shift demands from informants ranging from village elders to District Commissioner; from administrative police to Kenya wildlife service personnel and by bitter experience of houses burning by government

evictors, the majority of Kalemwani respondents—70% for men and 80% for women said that they were informed of the shift by the District Commissioner. Nevertheless, majority of all the respondents—both from Chyulu and Kalemwani indicated that they learned about the shift through government civil servants—mainly those in the provincial administrative offices (appendices 4a. and 4b.)

#### **7.2.4.2. How Long was the Pre-shift Preparation?**

Asked about the time they took to prepare for the shift to Muuni, once again varying responses emerged from the Chyulu respondents. These ranged between “only a short” period to “over two years”. Some said it was very difficult to plan and prepare for the shift due to a lack of transport as shown in Appendix 4a. On the other hand, the majority of the Kalemwani respondents—50% and 80% for men and women, respectively said that it took them between one and four weeks to prepare for the shift (Appendix 4b).

#### **7.2.4.3. What Plans Were Made to Enable the Shift to Muuni?**

Asked the plans they made to enable them shift to the Muuni settlement scheme, 80% and 20% of Chyulu men and women, respectively said that they first traveled to Muuni and viewed their plots, built a simple house and started clearing the bush in order to open up a new crop farm. 10% of men and 60% of women sold their livestock for this preparation (Appendix 4a.). However, Kalemwani men and women responded variably to the same question. Various responses relating to hiring rooms received each 10% from men and 20% from women. The rooms were hired in the nearby Nairobi-Mombasa highway towns to settle their families as they continued with the task of building new houses and opening up the bush for new crop farms (Appendix 4b.).

This response has a bearing in the primary objective of this study because it shows the role livestock production plays in socio-economic processes of change in semi-arid areas of Kenya especially when people have big financial decisions to make.

#### **7.2.4.4. What Was Expected on Arrival at Muuni?**

Asked what they expected on arrival in Muuni, 80% of Chyulu men and 40% of the women said that nothing was expected except land. Another 40% of women indicated that they expected to find land and a nearby source of water while 20% expected to find land, a nearby source of water and hospitals and other community social amenities

(Appendix 4a.). Likewise, 90% of Kalemchwani men said they expected to find nothing else but bushed land. However, women varied in their response and only 40% agreed with men (Appendix 4b.).

#### **7.2.4.5. Did All Family Members Shift Together at Once?**

Asked whether they shifted with their families at once, 30% and 80% of Chyulu men and women, respectively affirmed this. The majority of men--60%, said that men moved first to build houses and/or prepare a crop farm before they went for their families (Appendix 4a.) On the other hand, 50% and 60% of Kalemchwani men and women, respectively indicated that the whole families shifted together at once. None of Kalemchwani respondents said that the family head had to move first (Appendix 4b.).

#### **7.2.4.6. Was there Lost Personal Property?**

Asked whether they lost, forfeited or left behind any personal items during the shift, 100% of both Chyulu and Kalemchwani men and women affirmed this. Similarly, 90% and 100% of Kalemchwani men and women respectively responded in the affirmative as shown in Appendix 4a. and 4b.

#### **7.2.5. Process of Acquiring New Land:**

As a general rule, those who qualified for land registration and allotment within Muuni settlement scheme should have owned a household either in Chyulu Hills or in Kalemchwani Maasai/Kamba dispute area. Information of those who qualified was supposed to be supplied by the respective local chiefs and their assistants. Site visit ratification of the qualified householders' list was supposed to be done by the respective local District Officers.

All the Chyulu men and women respondents said that a ballot system was used during the allotment of land. Balloting was done at different stations as shown in Appendix 5a. Likewise, a balloting system was used for Kalemchwani land allottees as shown in Appendix 5b.

#### **7.2.6. Land Use Plan on Arrival at Muuni:**

Respondents had different views and perceptions of how they adjusted to a land use plan on arriving at Muuni. Some of the land use plans adopted included formation of self-help working groups for clearing bush and putting up new houses. People engaged in

activities such as new planting techniques, dryland farming techniques, burning charcoal, using oxen ploughs and hiring tractor service. Some people had to sell portions of their newly allotted land in order to cope up with disease, famine and labour challenges. Although generally respondents said they were happy with the achievement they had made so far, there was always a reserved caution about the water problem. This was confirmed by the fact that the majority of them indicated water as a major problem that they all desired to see solved.

#### **7.2.6.1. Did You Have to Change Familiar Land Use Plans on Arrival at Muuni?**

The question as to whether people had to change familiar land use plans or not on arrival at Muuni received varied responses from all the respondents originating from Chyulu and Kalembwani areas as shown in Appendix 6a. and 6b. For Chyulu men, the highest response was 40% where they said they used more of oxen plowing in Muuni than they did in Chyulu Hills. As for Chyulu women, equal distribution---20% was given to each of the following responses:

1. ...did not change familiar land use plan
2. ...embarked on bush clearing as a first priority
3. ...Made use of oxen plow unlike in Chyulu Hills
4. ...sold livestock for cash to clear bush and build a house.

On the other hand, the highest response for Kalembwani men was likewise 40% but saying something different---that they did not change their familiar land use plan on arrival at Muuni. The second highest response—30% was that they could now manage their private land the way they wanted without having to consult or ask for permission from anyone. For Kalembwani women, the highest response was 40% saying that they now could plan, manage and work hard on privately owned land whereas 20% response was given for each of the following responses:

1. ...did not change familiar land use plan
2. ...embarked on determined hard work
3. ...could plan, manage and care for privately owned land

#### **7.2.6.2. Did you Sell or Buy a Portion of Land at Muuni?**

Asked whether they sold part of farm or bought some to add to the original allotment, 30% of Chyulu men said they did not sell any land and 10% said they bought

some land to add to the original allotment. Only 20% said they sold some 4 acres. On the other hand, 60% of the women said no portion of land was sold or added and 40% said they sold 3 acres as shown in Appendix 6a. 60% of Kalemwani men said they did not sell their land or any portion thereof, 20% said they sold three acres, 10% said they sold 5 acres and another 10% sold 1 acre. On the other hand, 80% of the Kalemwani women said they did not sell any land whereas 20% said they sold 1 acre as show in Appendix 6b.

#### **7.2.6.3. Are You Pleased With Own Farm Achievement So Far?**

When asked if they were happy with their farm achievements, there was a greater variation in the way Chyulu men responded compared to Chyulu women as can be seen in Appendix 6a. 40% of the men said they were happy with their achievement only during that year (1998) due to good harvests. Likewise, 40% of the women responded the same as men whereas 60% said they were not pleased with their achievements so far. Unlike Chyulu respondents, Kalemwani men and women did not vary greatly in their responses as can be seen in Appendix 6b. 60% of men said they were not pleased with their achievement so far whereas 40% said they were satisfied but only during that year (1998) due to good harvests. On the other hand, 60% of their women counterparts said they were not pleased whereas only 20% said they were pleased because of a good harvest but only during that year. Another 20% said the harvest was so good that they could even afford to sell the surplus.

#### **7.2.6.4. What Changes Would You suggest to be Made?**

Asked to suggest changes to improve their lot, appendices 6a. and 6b. help us to visualise how they responded. For Chyulu men, water development (60%) was their priority followed by soil conservation and water development (20%). Availability of tractor service and use of oxen plow were each mentioned by 10% of the men. On the other hand, their women counterpart attributed equal weight (20%) to each of the following:

1. Water development in the area
2. Buying more land
3. Increasing farming area and conserving soil
4. Develop water, build good house and use oxen plow
5. Use oxen plow and develop water.

There was however an extremely wide variation in the way Kalemchwani men responded to the same question in comparison to their women counterpart as can be seen in Appendix 6b. Men attributed 10% to each of the following items:

1. Water development in the area
2. Develop water, build good house and use oxen plow
3. Water development and building a good house
4. Water development and having good business
5. Water development, use of oxen plow and being able to employ a farm worker.
6. Provision of tractor service and water development
7. Conserve soil, develop water and build good house
8. Develop water, increase land, and provision of oxen plow
9. Provision of water and increasing of land
10. Conservation of soil

On the other hand, 80% of their women counterparts suggested that the development of water, building a good house and having an oxen plow would go a long way in alleviating their problems. The remaining 20% indicated that use of oxen plow and water development was inevitable.

#### **7.2.6.5. What Are Your Immediate Plans?**

Asked to mention what their immediate plans would be, Chyulu men mentioned several activities as can be seen in Appendix 6a. but 'harvesting' received the highest score 30% in relation to other activities. Likewise, 60% of their women counterparts gave the highest score to harvesting. On the other hand, as shown in Appendix 6b., 60% of the Kalemchwani men attributed the highest score to 'land preparation by removal of crop residue' whereas 80% of their women counterparts gave the highest score to 'land preparation by the removal of crop residues and planting'.

#### **7.2.6.6. Have You Learned Any New Skills Here in Muuni?**

Asked whether they had learned new skilled labour techniques while in Muuni, Appendix 6a. shows that 40% of Chyulu men said they had not learned any new labour skills. The second highest score (30%) was given to skills learned from AMREF. Eighty percent of their women counterparts said they had not learned new labour skills. The remaining 20% said they had learned how to adapt to dryland life and farming methods. Seventy percent of the Kalemchwani men said they had not learned any new labour skills.



The remaining 30% said they had learned how to adapt to dryland life and planting methods. 100% of their women counterparts, said they had not learned new labour skills (Appendix 6b.).

#### **7.2.7. Description of Work Activities:**

Generally, respondents agreed that it was the house head's duty to oversee household work assisted by his wife and children where this is possible. Major household duties are generally done by self-help groups, friends or neighbours. However, not much assistance is obtained from outside family members. There was a general agreement that people work on others' farms but this is only done on request and for wages. Affiliation to self-help groups was more pronounced with women than with men. Hiring of farm labour was not common probably due to general lack of money. Working for non-farm wages was common in the scheme. Almost every respondent said they did not receive enough help and suggested that government or any other aid agency such as none governmental organizations and church groups should come to their aid. A considerable number of the respondents agreed that their farms compared poorly with neighbours' but some qualified this statement by saying that ecologically, theirs was better but poorly managed. The greater number of the respondents said they did not have other sources of income except from their farms.

The summaries for these responses are shown in appendices 7a. and 7b.

##### **7.2.7.1. Who Does Daily Household Tasks?**

Chyulu men indicated that it was the duty of the household head to oversee the household work done. They indicated that all members of the family are supposed to contribute. However, the contribution given by their wives received the highest score (40%) followed (30%) by that given by both wives and children. Eighty percent of their women counterparts said they only received assistance from their children whereas the remaining 20% said they did the housework alone as can be seen in Appendix 7a.

Seventy percent of the Kalemwani men, indicated that wives and children contributed greatly to daily household chores whereas the remaining 30% said the assistance came from their wives only. However, 100% of their women counterparts, said the assistance came from their children only, as can be seen in Appendix 7b.

### **7.2.7.2. Who Does Major Household Tasks?**

Chyulu men said that working groups (50%) were most important in this regard however twenty percent said that their wives assisted in big household tasks. The remaining 30% attributed this to 'working groups and hired labour'-10%, 'husband and wife'-10% and 'wife's and children's assistance'-10%. Of the women counterparts, 60% said they relied on working groups. 20% attributed this to neighbors' assistance and the remaining 20% to friends and working groups (Appendix 7a.).

Fourty percent of the Kalembwani men attributed the highest score to "friends' assistance". This was followed by working groups (20%). Sixty percent of their women counterparts attributed the highest score to working groups as can be seen in Appendix 7b.

### **7.2.7.3. Any Assistance Outside Family Members?**

Seventy percent of Chyulu men and 40% of their women counterparts said that they did not receive any assistance outside family members. Other responses mentioned include, assistance from church groups, little help from neighbours, help from working groups, and help from working groups and friends as can be seen in Appendix 7a.

Eighty percent of the Kalembwani men said they did not get any help outside family members. Sixty percent of their women counterpart said they received assistance from working groups. Only 20% of the women said they did not receive help outside family members as can be seen in Appendix 6b.

### **7.2.7.4. Is Any Work Done on Other Peoples' Farms?**

Thirty percent of the Chyulu men attributed "not working on other peoples' farms" the highest response to this question. Twenty percent said they did this only when requested. Other responses, which affirmed the question positively included mutual group, work arrangements and wage earning. Sixty percent of their women counterparts, affirmed this positively but only when requested to do so. The remaining 40% were equally attributed to mutual group work arrangements (20%) and to request/mutual work groups as shown in Appendix 7a.

As shown in Appendix 7b., 50% of the Kalembwani men responded positively but only when they are requested to do so whereas the other 50% said they did not do work

on other peoples' farms. Their women counterparts, attributed 20% to each of the following responses:

1. Yes, but only when requested to do so
2. No, I do not work on other peoples' farms
3. Yes, but only when requested to work for wage
4. Yes, but I work only for money

#### **7.2.7.5. Any Affiliation to a Communal Group?**

Seventy percent of the Chyulu men and 80% of their women counterparts answered this question positively by saying they were affiliated to self-help-working groups as can be seen in Appendix 7a.

Appendix 7b. shows that 40% of Kalemwani men said they were affiliated to self-help group works. Another 40% said they were not affiliated to any group. The remaining 20% said they were only affiliated with their wives. However, all their women counterparts responded in a positive affirmation (100%) and said they were affiliated to self-help-working groups.

#### **7.2.7.6. Ever Hired Any Labour?**

Only forty percent of the Chyulu men responded in affirmation to this question. 30% and 20% of them said they 'never hired labour' and 'hired working group', respectively. However, 80% of their women counterparts responded negatively to this question whereas 20% said they had hired working groups ( Appendix 7a.)

In Appendix 7b, 60% of the Kalemwani men said they never hired labour whereas 30% said they did hire labour. Likewise, 60% of their women counterparts said they never hired labour whereas 20% did so and another 20% said they hired working groups.

#### **7.2.7.7. Ever Worked for Wages?**

The majority of the Chyulu men and women did work for wages to support their families as can be seen Appendix 7a. 70% of the men and 80% of the women respectively, answered this question positively. Ten percent of the men said they earned wage money by using an oxen plow to work on other peoples' farms.

The Kalemwani men and women reported the same behavioural pattern. Seventy percent of the men and 60% of their women counterparts responded positively to the

question. None of the Kalembwani men mentioned the use of an oxen plow in an effort to earn wages as can be seen in Appendix 7b.

#### **7.2.7.8. Getting Enough Help? Who Would Help if Not?**

The majority of the study respondents responded negatively to this question and pointed to government and other non-governmental organizations as the agencies that should come to their aid. As Appendix 7a. shows, this statement is confirmed by 40% of the Chyulu men and women. However, other responses were mentioned in connection with this question. These included the following for the Chyulu men:

1. Not enough help and government can help (20%)
2. Not enough help and government loans can help (10%)
3. Not enough help (10%)
4. Not enough help and NGOs could help (10%)
5. Yes, I get enough help when there has been adequate rainfall to support bumper harvest (10%)

For Chyulu women, the responses included:

1. Not getting enough help and any welfare body could help (20%)
2. Not getting enough help and government or any other willing helper could help (20%)
3. Yes, I get enough help (20%)

Although the same response pattern was followed by the Kalembwani men and women, they indicated higher percentages than Chyulu respondents. Eighty percent of both men and women said they did not get enough help and that government and other NGOs could help as shown in Appendix 7b.

#### **7.2.7.9. How Does the Farm Compare with the Neighbours'?**

The majority of the respondents both from Chyulu and Kalembwani said their farms were worse than those of their neighbours. Seventy percent and 60% of the Chyulu men and women respectively confirmed the above statement. Only 10% and 40% of men and women respectively said that their farms were better than those of their neighbours as can be seen in Appendix 7a .

On the other hand, 50% and 100% of Kalembwani men and women respectively said their farms were worse than those of their neighbours. Thirty percent of the men said their lands were ecologically better than those of the neighbours but managerially worse.

At least 10% of them said their land was better of than those of their neighbours since they had an oxen plow to prepare their land faster and in good time; to increase their farming area if needed and to improve the soil moisture holding capacity.

#### **7.2.7.10. Do You Have Any Other Source of Income?**

This question received a highly negative response from all the respondents. Eighty percent and 100% of Chyulu men and women, respectively confirm this statement. Likewise, 90% and 100% of Kalembwani men and women, respectively qualify the statement as can be ascertained by appendices 7a. and 7b.

#### **7.2.8. Shopping and Marketing:**

In this topic, respondents explained their local marketing system. Two marketing systems were mentioned. One of them was the use of village kiosks and local shopping centres. The other one was the use of the main divisional market for major marketing transactions such as the sale of livestock and food. Respondents also explained the basis on which some kiosks were used or not used as shown in appendices 8a. and 8b.

##### **7.2.8.1. Are the Local Kiosks Used and on What Criteria?**

This question received varied positive responses from all the respondents. 30% and 20% of Chyulu men and women, respectively, said they chose kiosks on the basis of the credit offer. Forty percent of women and 10% of men chose the kiosks on the basis of proximity. Twenty percent of men chose kiosks on the basis of stock adequacy. None of the women respondents chose kiosks on this basis. Twenty percent of the women said they chose the kiosks on the basis of pre-shift acquaintance as shown in Appendix 8a.

Forty percent and 60% of Kalembwani men and women, respectively said they chose the kiosks on the basis of proximity. 20% of the men and women said they did not use village kiosks but did their shopping in the nearby shopping centres situated along the Nairobi-Mombasa highway as shown in Appendix 8b.

##### **7.2.8.2. What are Main Market Centres near Here?**

Except for the 20% of Chyulu men who mentioned Mbui-nzau as a major market, the rest of the respondents, originating from Chyulu and Kalembwani alike mentioned Makindu as their main Market as shown in appendices 8a. and 8b.

Mbui-nzau market is situated a few kilometers (about 5 km) from the centre of the scheme (Ilatu) along Nairobi-Mombasa highway. It a large fruit/vegetable and grocery market. On the other hand, Makindu (about 14 km. away from Ilatu) is the main divisional market and receives all kind of merchandise from various upcountry areas. The grocery market is also very active. There is also a livestock market, which attracts not only local traders but also upcountry and coast livestock traders.

#### **7.2.9. Neighbour Relationship:**

Under this topic responses made relating to neighbour relationships will be described. There were varied and mixed feelings concerning neighbour relationships. Some said the relationship was strong in time of need whereas others said only those who had come from the same original areas showed good neighborliness. As to whether neighbours were known before coming to Muuni, the general agreement was that only those who knew one another before the move were familiar. Generally, neighbours were said to be friendly, helpful and cooperative although this was qualified by various statements such as “yes, on request”, “yes, in time of dire need”, yes, only during farm peak seasons”, “yes, but not all”, “yes, but only those familiar to one another” etc. This has a reflection to my objective of the study in showing the changing social relations between individuals and groups as a result of this relocation. Concerning, more intimate neighbour help such as child care, field work and livestock care, the general agreement was that this was possible under prior arrangement. However, they said that cooperation would be automatic during crisis or other stressful situations such as alarms on fire, theft, wildlife attack, accidents and serious sickness. Mutual neighbour visits were very common in which the future of Muuni in relation to water and children would dominate the discussion. The frequency of visits varied from once a week to once a month. Respondents generally agreed that neighbour relations were better in their former settlement areas. Disputes in Muuni however were not very common. Those who responded positively to having been involved in a dispute mentioned trespass-related disputes especially crop damage by livestock. The ensuing are the main responses as extracted from appendices 9a. and 9b.

##### **7.2.9.1. Are Muuni People Friendly/Helpful/Cooperative?**

Generally, Muuni people were said to be friendly, helpful and cooperative but although this was the general feeling it did not receive a high score (only 40% from Chyulu men) because various people responded differently. Fourty percent of Chyulu

women said that some people met the above criteria whereas others did not. Other responses are also shown in Appendix 9a.

Sixty percent of the Kalem bwani men said the above criteria were somehow met by the people of Muuni. Their women counterparts however responded differently. 60% of them (those who had originated from the same place) met the above criteria. Other responses can also be seen in Appendix 9b.

#### **7.2.9.2. Were the Neighbours Known Before Coming to Muuni?**

Eighty percent and 40% of Chyulu men and women respectively responded negatively to the above question. But another 40% and 20% of the women and men respectively said that some neighbours were known before coming to Muuni as can be seen in Appendix 9a.

All Kalem bwani women and 70% of their men counterpart said only those neighbours who had originated from Kalem bwani were known before coming to Muuni. Other responses are shown in Appendix 9b.

The above analysis clearly indicates that social relations existed among the people of the same pre-relocation area.

#### **7.2.9.3. Are Neighbours Friendly/Helpful/Cooperative?**

This question received varied responses the highest, 30% by Chyulu men, being positive and the second highest 20% also positive but adding that not all acted positively. Forty percent of their women counterparts said that neighbours only met the above criteria in time of dire need. Other responses were mentioned too as shown in Appendix 9a.

Forty percent and 60% of Kalem bwani men and women, respectively said neighbours were not cooperative except those who had originated from Kalem bwani. Another 40% of the men said only some neighbours met the above criteria. Other responses too were mentioned as can be seen in Appendix 9b.

#### **7.2.9.4. Do Neighbours Help in Childcare, Field and Livestock Work?**

Once again, this question was met by varying responses from Chyulu respondents but 50% and 40% of men and women, respectively said these criteria were met only when there had been prior agreement. Another 40% of women and 20% of men said this was possible on request. There were other responses too as shown in Appendix 9a.

Kalembwani respondents were more focused in that 90% and 100% of men and women, respectively affirmed positively that neighbours met this criteria as shown in Appendix 9b.

#### **7.2.9.5. Do Neighbours Cooperate in Time of Crisis?**

As soon as they are alerted, neighbours cooperated in times of crisis such as theft, house burning or accident etc. 100%, 80%, 100% and 100% of Chyulu men and women, and Kalembwani men and women, respectively supported this statement as shown in Appendix 9a. and 9b.

#### **7.2.9.6. How often are Mutual Neighbourly Visits Made?**

This question received varied responses as shown in Appendix 9a. Weekly or fortnightly visits received the highest score according to 30% of the Chyulu men. Their women counterparts attributed 20% to each of the following responses:

1. Mutual neighbourly visits are very rare
2. Mutual neighbourly visits are done once per month
3. Mutual neighbourly visits are done once per fortnight
4. Mutual neighbourly visits are done only on Sundays but not always
5. Mutual neighbourly visits are done once per week

Other responses can be seen in Appendix 9a.

Kalembwani respondents were a more focused in that 50% of the men said they made mutual neighbourly visits on Sundays whereas 60% of their women counterpart said the mutual visits were made once or twice per month. Other responses to this question can be seen in Appendix 9b.

#### **7.2.9.7. What are Main Discussion Topics during Mutual Visits?**

Topics of discussions during mutual neighbourly visits were many, as can be seen in appendices 9a. and 9b. Of great importance were topics relating to future of Muuni as mentioned by 50% of Chyulu men and the water problem as mentioned by 50% of the Chyulu men . Again 80% of their women counterparts mentioned money as the main topic of discussion whereas another 60 percent said that their discussion focused on



matters relating to group organizations. Other important topics of discussions were also raised as can be seen in Appendix 9a.

Likewise, 50% of Kalemchwani men said their discussions focused on matters touching on the future of Muuni and another 50% said they discussed water problems. 60% of their women counterparts discussed matters relating to money problems and another 40% discussed groups and group affairs. Other matters were also discussed as can be seen in Appendix 9b.

#### **7.2.9.8. What Can You Say About Neighbour Relations Pre- and Post-Shift?**

Responding to this question, 80% of Chyulu men and women said that neighbour relations were better in Chyulu than they were in Muuni. The main reasons given by majority of the respondents were that people were more satisfied and happier under Chyulu conditions.

Eighty percent and 60% of Kalemchwani men and women respectively said that neighbour relations were better in Kalemchwani than in Muuni. The same reasons as those of Chyulu respondents were given. However, 40% and 20% of women and men of Kalemchwani, respectively said that neighbour relations were better in Muuni than they were in Kalemchwani. The main reasons given for this were that at Muuni, people had their own lands and they did not have the worry of eviction or tribal cleansing. These responses and others can be seen in appendices 9a. and 9b.

The above analysis relates to one of my study objectives in showing the changing social relations between individuals and groups as a result of this relocation. It helps us to appreciate the fact that people had co-existed for a long period and thus had developed stronger social relationships in their pre-relocation areas than in Muuni. Of course this can be understood in view of the fact that people of Muuni had originated from different areas. Those who said that social relations were better in Muuni than in their original settlement areas might have been referring to relations between family members and pre-relocation acquaintances. They might however been referring to relations between them and people originating from other areas and if this is the case, this must have taken place only after the people had started becoming familiar to one another and in an endeavour to build the disrupted social and infrastructural systems.

#### **7.2.9.9. Have You Ever Had a Dispute With Neighbours Here in Muuni?**

In response to this question, 50% and 80% of the Chyulu men and women, 50% and 100% of Kalemchwani men and women respectively said they never have had disputes

with neighbours. However, 40% and 20% of Chyulu men and women and 40% of Kalembwani men, respectively said they have had disputes with their neighbours. None of the Kalembwani women indicated ever having a dispute with the neighbours. The majority of the disputes were due to trespass by livestock and consequent crop damage.

#### **7.2.10. Family Relationship:**

Three aspects of family relations will be highlighted in this topic. These will include the non-family residents living in the household; relatives living within the scheme and; the family relations pre- and post-shift. Respondents were in agreement that they did not have non-family residents in their households and the majority of them said they did not have other relatives within Muuni scheme. Family relations pre- and post-relocation did not differ. Appendices 10a. and 10b. and the ensuing description will help in understanding how the study respondents perceived these aspects.

##### **7.2.10.1. Are There Non-Family Residents in the Household?**

The majority of the respondents said they did not have non-family members living with them in their households. 90% and 100% of Chyulu men and women affirms this, respectively. Likewise all the Kalembwani respondents, both men and women did not have non-family residents in their households as attested by Appendix 10a. and 10b.

##### **7.2.10.2. Do You Have Other Relatives in Muuni?**

Once again, a majority of the respondents indicated that they did not have other relatives in the Muuni settlement scheme as shown by the 60% and 80% of Chyulu, 70% and 80% of Kalembwani men and women, respectively. Appendices 10a. and 10b. attest to this response.

##### **7.2.10.3. How Do You Compare Family Relations Pre- and Post-Relocation?**

As shown in appendices 9a. and 9b., considerable variation was noted in the way respondents responded to this question. The general agreement among various respondents was that family relations did not vary according to the area of settlement. However, 40% and 30% of the Chyulu women and men, respectively said that family relations were better in Muuni than in Chyulu Hills. Ninety percent and 60% of Kalembwani men and women respectively indicated that family relations did not vary according to settlement areas. The reasons given for this was the fact that people had

their registered own farms and this gave them a sense of ownership and security. This can be understood in the view of the fact that people have had no legal land occupation rights in their pre-relocation areas. For the first time they could now talk about what is suppose to be legally registered to them.

#### **7.2.11. Village Leadership:**

During the study period, there were seventeen villages and a village elder headed each. Village elders were either voted in by the villagers or were appointed by the area Assistant Chief. The assistant chief appointed the majority of the village elders. Their leadership and advice were described as being good or bad. Reasons for being good were described as “making timely awareness to villagers” concerning major community issues such as planting seasons, availability of new plant and animal varieties, availability of extension services, presence of NGOs and their intended purposes, issuance of new governmental regulations and making people aware of the prevailing political atmosphere. On the other hand the village elder would be said to be bad if he demands graft for his service, would be partial in solving a dispute or discriminatory in discharging his services to the villagers.

##### **7.2.11.1. How Was Your Village Elder Chosen?**

Eighty percent of Chyulu men said the assistant chief appointed their elders and only 20% of them said they voted in their village elders. Sixty percent of their women counterparts said they voted in their village elders and the remaining 40% of them said their Assistant chief appointed them. All the Kalemwani respondents said their village elders were appointed by the Assistant. These responses are summarized in appendices 11a. and 11b.

The message received here shows that the Assistant chief has an upper hand in appointing village elders of his choice and presumably he likewise has a right to fire them if they do not toe the line.

##### **7.2.11.2. What Can be Said About Their Leadership?**

Both Chyulu men and women attributed high ratings to their village elders concerning their good leadership and advice. Ninety percent and 80% of men and women respectively affirmed this fact. However, there was greater variability in what Kalemwani respondents said. Whereas 50% of the men said their leaders were good

advisers, only 20% of their women counterparts confirmed this fact whereas 60% said that not all leaders were good. People were reluctant to say in which ways some of their village elders were bad. In fact 20% of the women said they had no comment to make regarding the quality of the leadership offered by their village elders. Probably the 10% of the men who said that some leaders were asking for and accepting grafts might give us a clue. Other responses made regarding this matter can be seen in appendices 11a. and 11b.

#### **7.2.12. Religious Affiliation:**

The majority of the respondents from the Chyulu Hills claimed that they were Christians within different religious denominations as indicated in Appendix 12a. On the other hand, quite a considerable number of those who had originated from Kalembwani said that they were not Christians but animists. For Chyulu respondents, Baptist and Catholic churches seemed to make the greatest impact whereas Animism, Redeemed and Catholic churches were the corresponding cases for Kalembwani respondents. As shown in appendices 12a. and 12b., to a considerable degree, religious groups contributed to peoples' social, spiritual, emotional and physical needs. Respondents generally agreed that they did not know the church members prior to coming to Muuni unless they happened to live in the same locality of their pre-shift settlement areas. Apart from spiritual nourishment, church groups also helped in issues such as sickness and farm and building work. During a crisis church groups would help (especially those to which the villager belonged)

##### **7.2.12.1. Are You Affiliated to a Religious Group?**

In response to the above question, the highest rating was 40% for both Chyulu men and women who identified themselves with Baptist and Catholic churches, respectively. Other respondents as shown in Appendix 12a also mentioned other churches. 40% and 30% of the Kalembwani women and men, respectively identified themselves with the Redeemed church and animism. Likewise, other respondents as can be seen in Appendix 12b mentioned other churches.

##### **7.2.12.2. Were the Church Members Known Before Coming to Muuni?**

Fifty percent and 60% of Chyulu men and women respectively, said they did not know church members prior to coming to Muuni. On the other hand, 50% and 80% of Kalembwani men and women respectively said they knew those members who had come

with them from Kalembwani. Forty percent of the men however said that this question did not apply in their case since they were animist. Other responses to this question were also made as shown in appendices 12a. and 12b.

#### **7.2.12.3. What Other Functions Does the Church do Beside Worship?**

The religious groups were involved in helping their needy followers especially during sickness as attested by responses made by Chyulu and Kalembwani respondents and shown in appendices 12a. and 12b. 40% and 80% of the Chyulu men and women respectively affirmed this. Kalembwani respondents however varied in their responses but assistance with the sick still emerged prominently as attested to by various responses shown in Appendix 12b. Other assistance offered by the religious groups included farm work and any other urgent matter.

#### **7.2.12.4. Would the Church Help During Crisis?**

When asked whether the Church would help in time of crisis, all respondents apart from those who claimed to be animists responded positively to the question. Like any other self-help group, religious groups assisted the needy cases as much as they could.

#### **7.2.13. Communal Group Affiliation:**

In general, women dominated communal groups. Men had very few groups of their own. Most of those groups were formed between 1995 and 1996. Whereas some are still functional some are not. The main work done by these groups is farm-oriented although there are other functions involved such as house construction work and funds raising. Group membership was mainly composed of the villagers themselves. Most of these groups were formed as a result of encouragement given by the community development agency as well as local NGOs. Another form of grouping is Parent and Teachers Association (PTA). The main function of this association is to help develop fledgling primary schools by offering manual labour. Other functions may include annual meetings where the decisions for the academic welfare of the children are made but this did not feature prominently in the discussions. Appendices 13a. and 13b. highlight some of the main responses made to various questions relating to membership, group formation and group functions.

#### **7.2.13.1. Do you Belong to Men/Women Group?**

As shown in appendices 13a. and 13b., almost every Chyulu man and woman in the study sample belonged to a group. Women were more focused in that 80% of them identified themselves with women groups. Men varied in their response since they generally did not have groups identified as purely “men groups” The majority of them affiliated with women groups. Kalemwani men were more focused in their response to this question in that 60% positively affirmed it whereas the remaining 40% said only their wives belonged to self-help groups. All of their women counterparts belonged to groups.

#### **7.2.13.2. How was the Group Formed?**

There was no given pattern as to how the groups were formed except that they all seem to have been formed between 1995 and 1996. Some of the reasons given for their formation were based on the self-help spirit especially on farm work, helping sick cases, raising money for self-help projects etc. Others were formed based on religious reasons while yet others were formed as a result of the village elders’ initiative. Group membership varied between 15 to 40 as shown in Appendix 13a. and 13b.

#### **7.2.13.3. Who Else Belongs to the Group?**

Seventy percent and 80% of Chyulu men and women, respectively said members were from the local area (or village). Kalemwani men however were more varied in their response while their women counterpart were more focused in that 60% of them said that members were from the same village. Other responses made can be seen in appendices 13a. and 13b.

#### **7.2.13.4. What Does the Group Do?**

There was no particular clear pattern regarding the responses given for this question although a considerable percentage (40%) of Chyulu women said that the main function would be to raise funds. The highest rating by their men counterparts on the other hand was 30% which said that the group was involved with farm work.

Kalemwani women were more focused in that 80% of them said that the group was involved with farm and construction work. Their men counterparts were more varied but they all mentioned tasks to do with farm work except the 20% who mentioned being involved in apiculture. Other responses made can be seen in appendices 13a. and 13b.

#### **7.2.13.5. Do You Belong or Know of Any Other Group in Muuni?**

The highest rating for this question was 50% and 60% for Chyulu men and women, respectively who said they knew of other groups in Muuni although they did not necessarily belong to them. Only 30% and 60% of Kalembwani men and women, respectively affirmed this. The highest rating by Kalembwani men was 40% who said that that they did not belong to another group. Other responses are contained in appendices 13a. and 13b.

#### **7.2.13.6. Do You Meet With Other Members of Parents and Teachers Association (PTA)?**

The highest rating for this question as perceived by Chyulu men and women was 70% and 40%, respectively who said they met every Tuesdays at their respective primary schools to do school work for their fledgling institutions. Another 40% of the women said they met every Tuesdays and Fridays for the school work. Seventy percent and 100% of Kalembwani men and women respectively affirmed that they met every Tuesday for the school work. Other responses made may be seen in appendices 13a. and 13b.

#### **7.2.14. External Aid or Assistance:**

As highlighted in appendices 14a. and 14b., external aid and assistance was received mainly from NGOs, GOK and Churches though not on regular basis. Among NGOs, AMREF features prominently and only Catholics and the Redeemed churches were said to have contributed to the community something worth remembering. Although GOK was mentioned as one of the aid agents it was nevertheless blamed for its unreliable provision of famine relief food in terms of quantity and regularity. In 1992, the Government of India also contributed food only once but it made an unforgettable impact since they supplied big quantities of rice (50 kg per household) indiscriminately. They also supplied farm tools such as spades, machetes and hoes. Superstitions were rife then that this rice would bring bad omens to the community and anybody eating this rice would die and be buried, hence the provision of the spade and the hoe to be used for digging graves.

Generally, respondents agreed that aid provided by these agencies had helped them momentarily but did not solve their long-term problems. So, when they were asked what other help would be needed, oxen ploughs and water development emerged

prominently. Other important aspirations included permanent houses, land title deeds, loans and tractor services.

#### **7.2.14.1. Have You Ever Received External Help/Advice/Assistance?**

AMREF was honored with the highest rating by all respondents in that 60% and 80% of Chyulu men and women, respectively and all Kalembwani men and women mentioned this Foundation. Other agencies mentioned by Chyulu respondents included the governments of Kenya and India, and church organizations as shown in appendices 14a. and 14b.

#### **7.2.14.2. Did the Aid Help?**

“Yes, it did help indeed”, was the response given by 60% and 80% of the Chyulu men and women, respectively whereas all the Kalembwani respondents affirmed this. All other responses mentioned by the Chyulu respondents include AMREF too as can be seen in Appendix 14a.

#### **7.2.14.3. What Help Would be Needed Now?**

As shown in appendices 14a. and 14b., there was no sharp pattern identified within the responses made by the Chyulu respondents. However, it is worthwhile to note that most of the responses made mentioned oxen ploughs, water development and others such as land title deeds, loans, permanent houses etc. The Kalembwani were more focused in that 90% and 40% of men and women, respectively mentioned oxen ploughs and permanent house and water development. Twenty percent of the Kalembwani women remembered to mention the need for school fees and textbooks for their school-going children as can be seen in Appendix 14b.

#### **7.2.15. Life and Future of Muuni:**

The clear message that came from the respondents toward this question was that unless water development was effected or rainfall improved (and they often cited the abnormally high rainfall that was going on during the time of this interview), Muuni life and future would remain a misery all the time. Kalembwani respondents were much more focused on this since all the men and 80% of the women pointedly said Muuni can only improve if water is available. Respondents were very careful not to directly say they were



unhappy with the Muuni Scheme in general hence they always paraphrased their statements with:

*.....Muuni can be a good place if there is water, hospital etc. or Muuni is bad but if there would be water and hospital and good schools and good houses etc., then it would be a good place because like this year (1998), people are happy due to high harvests as a result of sufficient soil moisture.....*

#### **7.2.15.1. Is Life in Muuni Bad or Good?**

In response to this question, 60% in each case of the Chyulu men and women, 60% and 100% of Kalembwani men and women respondents, respectively said life in Muuni would be good if there was water. Other responses too were made with regard to this question as can be seen in appendices 15a. and 15b.

#### **7.2.15.2. Is Muuni Future Expected to Improve or Get Worse?**

“Improve if water is available” is the response made by 40% and 60% of Chyulu men and women, 100% and 80%, of Kalembwani men and women, respectively to this question. Another 40% of Chyulu men said that Muuni can only get worse. Other responses made can be seen in appendices 15a. and 15b.

#### **7.2.15.3. What are Expected Changes Within One Year From Now?**

When the respondents were asked to state the changes they expected within one year, the majority of them generally referred to the rain that was prevailing then and said if the rainfall continued that way, then people would generally improve their lot and that water, food, health, business and group cooperation would improve. However a few of them said that the future could not be known and so they had no comment. Chyulu men and women seemed to vary in their responses but with considerable convergence, 20% and 40% for men and women, respectively saying that the Muuni situation would improve if the rain continued the way it was doing during the time of this interview. Kalembwani men and women were a little more focused in what they said. For instance, 60% and 40% of men and women, respectively affirmed what Chyulu respondents have said above. Another 60% of the women said that they expected business to increase. Other responses can be seen in appendices 15a. and 15b.

#### **7.2.15.4. What are Expected Changes Within Five Years From Now?**

About the expected changes in the next five years, whereas some said they could not know about the future (60% and 20% of the Chyulu women and men, respectively), others said they were optimistic that with availability of external aid, schools would not only increase but would also improve, and water and hospitals would be available. Vice versa if no aid is made available others thought Muuni would become a treeless dust bowl or desert-like country.

However, the Kalembwani respondents adamantly refused to comment on the perceived expectations of the five years period. Ninety percent and 100% of men and women, respectively said that future was unknown to them whereas 10% of the men said that only God could know the future.

#### **7.2.15.5. What is the Most Hoped For Achievement Within One Year From Now?**

When they were asked what they hoped to achieve in one year's time, unlike their men counterparts, Chyulu women were more focused in that 60% of them said they would like to start a business. Men seemed to vary a lot mentioning aspirations which focused on development of business, building better houses and increasing livestock. Other aspirations perceived by Chyulu women included making bricks for better houses (20%) and building better houses and buying commercial plots as can be seen in Appendix 15a.

The same response pattern was assumed by the Kalembwani respondents only in this case women were not focused on one particular aspiration. They seemed to vary equally among aspirations based on various small-scale businesses. Forty percent of their male counterparts seem to be more focused on kiosk business whereas others seemed to vary among other form of businesses. Generally speaking, respondents perceived engagement in business as the panacea for their problems in a one year period only if the rainfall would continue the way it was doing at the time of this interview. Appendix 15a. and 15b. attest to this view.

#### **7.2.15.6. What is the Most Hoped For Achievement Within Five Years From Now?**

About the 5 years hoped for achievements, respondents seemed not to be sure of themselves and what would happen in that long period. A few respondents especially from Chyulu were however ambitious and said that they aspired to own oxen plough,

develop a business, acquire some plots, build permanent houses, increase farm size and buy new land. The majority of the Kalembwani respondents, 90% and 60% of men and women respectively, said they did not want to comment because the future was unknown. Twenty percent of the women said that unless rich people or other aid agencies came to their aid, there would be no hope for the future in the Muuni settlement scheme. Ten percent of the men felt differently and wanted to leave this in the hands of God, the only one who was able to tell what would happen to their future. These and other responses can be seen in appendices 15a. and 15b.

- It will be remembered that in section 1.2. of chapter one in this thesis, I had indicated my desire to test how Scudder's model of social change in resettlement fits in this study especially in areas of social land use behavioural pattern. This chapter contains a mass of detail that helps in identifying the two stages (2 and 3) of the model that fit in this study. The mass of detail has also contributed to my ability in devising a unique 5-step socio-economic model contained in section 8.10. of chapter 8 in this thesis.
- This study takes Scudder's model as a starting point for investigation of the social and landuse behaviours (particularly livestock production) of Muuni community formed as a result of unplanned involuntary resettlement in Makueni District of Kenya.
- In the eye of a rural social anthropologist this chapter contains a mass of detail which helps in having a general understanding of the Muuni community in terms of their past and present situations, and their aspirations for the future.
- The mass of detail has also helped in collaborating the information given by other study respondents in different settings. In many instances, the case study respondents affirmed the information already given elsewhere by different respondents. This gave credit to the overall study information for which I feel confident in presenting in this thesis. The mass of detail has also helped us to have a general understanding of where the Muuni people came from, where they are and where they are going. Further, it has shed light to an understanding of the struggle people are undergoing in building their disrupted social resources.
- A community without future aspirations is as good as a non-existent one. This chapter has a mass of detail that sheds light to peoples' short- and long-term future aspirations.

### **7.3. Conclusions:**

- ◆ In any social study, triangulation of information helps in attaching credit to the information given by various respondents. The foregoing chapter has generally indicated that the information given by the case study respondents agreed fairly well

with what all the other study respondents said. Generally, men and women regardless of their place of origin responded more or less the same in showing that their pre-relocation social and production lifestyles had been adversely affected by the relocation. However, some differences in response to specific questions was noted as below:

- The Kalembwani people were better informed of relocation to the Muuni settlement scheme than were the Chyulu people. This was because the provincial administration gave more attention to the former group than they did to the latter. This enabled them to manage their resources more economically in order to facilitate shift procedure.
- Whereas quite a good number of Chyulu men said they had to leave their families behind to go and prepare the land and put up houses, their women counterparts said they shifted with their families at once. This can be understood in the light that these women were the household heads and they would not have anyone to take care of the children should they leave them behind.
- The Kalembwani householders shifted at once with their families and hired rooms in the nearby Mombasa-Nairobi highway. This can be understood in the light that the provincial administration had given them a two-week deadline to shift to Muuni.
- The Chyulu community was more communal group-affiliated than Kalembwani community. Kalembwani people associated more with their familiar acquaintances whereas Chyulu community was more outgoing. This can be understood in the light that Kalembwani people lived as closed community who needed each others help especially in times of Maasai cattle raids.
- Regardless of the place of origin, women were more group-affiliated than men. This is possibly explained by the fact that whereas men are usually seeking off-farm avenues for income generating activities, women are normally found at home taking care of domestic and farm affairs.
- During the mutual neighbourly visits, whereas men discussed the future of the Muuni settlement scheme in as far as water, ecology and infrastructure were concerned, women discussed mainly money and how they could organize fund raising through group spirit.
- Generally people did not want to comment about their long term hopes although some Chyulu men displayed their ambitions by mentioning the need to own oxen ploughs, develop business, acquire some business plots, build permanent houses, increase farming area and buy new land. In contrast, Kalembwani people left it to gods to decide their long-term fate.

- The conclusions based on the responses to the main specific inquiries are shown below:
- The study respondents' pre-relocation lives in food security, human health, livestock numbers, structure, composition and health and social relations were better than in the post-relocation area.
- The Kalembwani community has had a longer residence in the pre-relocation area than the Chyulu community.
- Almost all people from the Chyulu Hills and the Kalembwani area have had the same general ancestral areas of origin namely the upper Makueni District.
- Generally, respondents expressed their gratitude for their owning private land despite the many ecological and weather challenges. Householders mainly used simple hand tools to till their land and those who could afford them owned or hired the services of oxen ploughs and tractors.
- The main communal activities focus on crop food production practices and the farm labour supply is usually from household family members. Occasionally, group, partnership, neighbourly and friendly labour is employed especially in heavy farm tasks or during peak seasons. Hired labour exists but is very uncommon.
- As people gradually became familiar to one another, they endeavored to restore their pre-relocation disrupted social institutions and infrastructure. These included the following:
  - \* A Provincial administration system was set-up to provide security and keep people aware of the current political atmosphere and technological advancement.
  - \* Formation of farm work communal and partnership groups was started especially for helping in heavy farm tasks.
  - \* Worship groups emerged and constructed several temporary worship buildings based on various religious denominations.
  - \* Temporary primary school structures started to emerge and Parent-Teacher-Associations (PTA) were formed to oversee the school communal work and the academic welfare of the children.
  - \* Business premises in form of kiosks, shops, grain millers, hotels, pubs, open air fruit and vegetable sheds and bicycle repair shops started to develop.
  - \* Neighbourly cooperation and mutual assistance were strengthened and sharing especially in farm labour tasks was improved.
- The day-to-day simple marketing is done locally by the use of kiosks and shops. The main market is at Makindu Divisional headquarters, about 14 km away.

- The external aid was occasionally available and its impact in peoples' minds depended on the frequency and amount of goods and services supplied to the community. By no means was the aid able to solve peoples long-term problems.
- Majority of the respondents said that the future of Muuni would only improve and make it a better place to live in if water was brought nearer to the community.
- Peoples' short term aspirations were based on what was happening as a result of the El-nino rainfall that was going on then. Majority of the respondents said if the rain continued the way it was, people would improve their lot and that water, food security, health, business and group and individual cooperation would improve.

## **CHAPTER 8.**

### **CONCLUSIVE DISCUSSIONS AND RECOMMENDATIONS FOR FUTURE RELOCATION STRATEGIES**

#### **8.0. An Introductory Conclusive Overview:**

This overview focuses on the main study outcomes and conclusions based on two major components. These components are social anthropology and agro-pastoralism. The conclusive overviews are based on the study results contained in chapters 3 through to 7. Based on what this study has revealed, it is important to give a conclusive discussion overview on how the study objectives were or were not met.

It must be clearly understood that although the primary objective of this study was to improve our understanding of the role livestock production plays in socio-economic process of change in semi-arid areas of Kenya, the study has revealed that livestock production becomes overshadowed by crop production and other non-farm cash generating activities once agro-pastoralists lose their communal forage and water resource bases and acquire small-scale private land bases. This was the case for the Muuni community. However, other specific objectives were fairly addressed by showing the adjustment processes that took place to restore the disrupted social relations and to ensure food production and food security strategies and how these systems were affected by the relocation. The ensuing conclusive discussion reviews how the two main study components namely agro-pastoralism and socio-anthropology were affected by the relocation and the consequent modification process that took place towards subsistence systems. De Wet (1993) contends that whatever the type of relocation, there is always stress, the degree varying according to the type of resettlement. Among the three types of resettlement studied by Mc Millan (1995) in Burkina Faso, De Wet (1993) in South Africa and Gitunu (1994) in Kenya (Table 4.), the stress is greater if the shift is not voluntary and even worse if it is unplanned. This study involves an unplanned relocation making it appropriate to review and discuss how peoples' social and production systems were affected. Peoples' statements (mainly during group focus discussions, single subject interviews, and case studies concerning their pre- and post-relocation) status indicated how the relocation affected their social and production systems.

McMillan (1995) described Scudder's model of resettlement as a four-stage resettlement process. Those who have used this model to study the sociology of resettlement have concentrated mostly on planned situations where government intervention has provided support services. However, stages two (Settling in and

Transition) and three (Economic and Social Development) in particular have application to my study as shown in the ensuing topic 8.1 below.

### **8.1. Relocation Effects on Social Systems:**

For the purpose of social anthropological conclusive discussion, attention is drawn to aspects of relocation effects on social and production systems in the order listed below:

- Peoples' social relations
- Personal property and social amenities
- Land use
- Human and livestock health
- Ethno-tolerance
- Dispute and dispute solutions
- Food security strategies
- Restoration of disrupted social institutions and production systems
- Perceived pre-relocation planning strategies
- Perceived short and long term aspirations

Social systems in this study are analyzed and discussed at intra-household, inter-household and community levels. Main issues include family and neighbour interrelations; self-help groups, social amenities and infrastructures, land use, human and livestock health, ethno-tolerance, disputes and dispute solutions. Further, food security seasonal strategies in terms of livestock/crop production, wild food and external aid contribution is discussed. A discussion is also made on how people endeavor to restore their disrupted social and production systems, how they perceive what should have been pre-relocation planning strategies and how they view short and long term future aspirations.

#### **8.1.1. Peoples' Social Relations, Personal Property and Social Amenities In the Context of Settling in and Transition:**

One of the study objectives is to analyze changing social relations between individuals and groups, which result from relocation to semi-arid areas and the subsequent modification of the subsistence systems. The ensuing section deals with the degree of breakdown of previous social relations, which were necessary in holding together the community's and individuals' subsistence lifestyle.

Forceful eviction of Chyulu and Kalemwani communities affected human social relations at all levels from household to community. This reflects a lack of prior clear



planning, coordination and warning systems on the part of the evictors and is evidenced by the fact that forceful eviction at Chyulu Hills and Kalembwani area did not involve provision for where they should go following eviction. For about five years (1986-1992) the people lived in shanty makeshift dwellings erected in the towns found at the down slopes of Chyulu Hills and along the Mombasa-Nairobi railway line at Kalembwani, respectively. Three circumstances contributed to disruption of pre-relocation social relations:

- A long period of uncertain shanty dwelling life following eviction made some family members, close relatives and familiar neighbours scatter in search of better opportunities, breaking close social support systems. One study respondent said that he lost the social support of his brother when he went to a different area following eviction.
- When the government adjudicated Muuni and Masongaleni as resettlement areas, there was no provision to make family members, close relatives and neighbours settle in a common neighbouring area because land was allotted by ballot without considering pre-relocation family and neighbourly relations. One of the study respondents said that he was separated from his parents when they were allotted land at Masongaleni settlement scheme.
- In the new resettlement areas, some family members, close relatives and neighbours are separated due to the fact that the ballot paper randomly landed individual households in different blocks within the same resettlement area without considering their close social relations. One of the study respondents had to visit her relative every Sunday in a different village within Muuni.

In contrast, study respondents from Kibwezi were not forcibly evicted but had time to organise their shifting and probably choose where they wanted to resettle given the fact that they constantly consulted with the District Officer who was the presiding officer during the land allotment exercise. As a result therefore, their former social relationships, especially at the family level, were not as badly affected as those of people originating from Chyulu Hills and Kalembwani. However, due to changing land tenure in that they now were allotted individual plots at Muuni, unlike the village life at Kibwezi, their former close neighbour relations were no longer guaranteed in their new resettlement areas be it in Muuni or in Masongaleni resettlement schemes.

Generally respondents stated that pre-relocation social relations were stronger than the post-relocation ones. This would be expected due to the fact that people had lived together long enough to qualify for stage 3 of Scudder's model. Coupled with better

ecological potential and opportunities for wide spatial foraging and farming exploitation, it is understandable that people would make this response. This stage of Scudder's model is an economic and social development one, in which shifts from conservative, risk averse socio-economic orientation to more dynamic, open-ended, risk-taking is attainable as settlers get sufficient food to meet their subsistence needs and feel more comfortable with their surroundings. During this stage, more investment in land, cash cropping, inputs for farm production and education for children is manifest. Thus people in Chyulu had developed schools, shopping centres, churches/animistic worship sites; were growing highly valued perennial food crops such as fruit trees and banana plantations; had constructed permanent water tanks fed from iron sheet corrugated houses; and had high herd and flock sizes within the context of the Kenyan modern day agro-pastoral nexus. On the other hand, the pre-relocation lives of Kalembwani people indicate that they had developed deep intimacy with the Maasai people such that they were able to increase their herd and flock sizes as they continued exploiting vast Maasai forage resource within the wet-dry grazing system. Furthermore, they had been allowed to put up their residential houses and live among the Maasai community within what is customarily Maasai land (Gatheru and Shaw 1998). There were indications of barter trade between Maasai and Kamba people where Kamba people supplied grain to Maasai in exchange for animal products such as milk, meat and ghee and fat. All these are strong factors indicative that the pre-relocation lifestyles of the Chyulu Hills and Kalembwani area people were in the third stage of Scudder's model before their social and production systems were disrupted by factors related to non-demonic intrusions.

Except for those who originated from Kibwezi area, people's pre-relocation personal properties and social amenities were either lost, damaged, stolen, forfeited or demolished during the eviction pandemonium and the eventual transit process to the new resettlement areas. Some of the personal items involved included household properties such as houses, water tanks, iron sheets, food storage granaries, furniture, kitchen ware, farm tools and livestock. On the other hand, social amenities affected included schools and school records, churches and church records, shopping centres and kiosks, burial and animistic worship sites.

This would be expected given the fact that people were forcibly evicted without immediate prior planning, especially on organized transport system and resettlement opportunities.

### **8.1.2. Self-help Groups:**

This section deals with the changing and building social relations following relocation. In the second stage of Scudder's model, among other features identifying the behaviour of people at this stage, McMillan (1995) says that settlers cling to the familiar by moving into new settlement with relatives, former neighbours and co-ethnics. Although people had no option in choosing who should become their neighbours, they searched for their former folks and established new social relations. This was necessary if they were to survive the new challenging harsh ecological environments characterized by wild bush, tsetse flies, ticks, mosquitoes, drier ecological conditions, erratic and unreliable rainfall that threatened peoples' very survival. This stage was noted when people first arrived at Muuni. As people started getting familiar with one another, expanded relations were formed in a self-help group spirit, including fledgling school work groups such as Parent and Teachers Associations (PTA) and religious groups. Relationships also developed in the local marketing systems such as local kiosks. Relationships between operators of kiosks and the customers were based on proximity, stocking rate and credit availability and to some extent on pre-relocation acquaintance.

Self-help groups helped at first in heavier farm tasks like bush clearing. Most group formation ideas were initiated by women and later some men opted to be incorporated and work together with women. Men's groups are usually ephemeral in nature because they appear only when there is a heavy task to be performed and during peak labour seasons. This agrees well with what Bliss (1992) found concerning farming tradition in areas of the Caribbean and Central America. He said that for generations, women had maintained a stronger farming tradition than men and this appears to be true of the Muuni women community. In fact, Bliss mentions that while men were involved with the export-oriented citrus economy, women stuck to traditional farming systems. This seems to concur well with what men were doing in Muuni to improve their household economic status as evidenced by their household roles (there was an indication that men were more involved with cash generating activities such as charcoal burning, casual labour work, wage earning and permanent employment). Some exploited casual labour opportunities offered by the presence of the Mombasa-Nairobi highway towns. Two of the study respondents exploited this opportunity, one of them being a wood carver and the other a casual labourer.

### 8.1.3. Land Use:

Pre-relocation land use in Chyulu Hills was characterized by what appeared like a real traditional agro-pastoral nexus as described by Muthiani (1973) and McCorkle (1992). There was private household crop land where the home base would also be situated and there was also the vast upper Chyulu Hills area that was communally exploited. On private farms, due to hilly terrain and sometimes rocky conditions, farmers could only use simple hand tools. However, farms situated at the bottom of the hills were able to use oxen ploughs. A greater variety of food crops was grown due to favourable ecological and weather conditions described by Jaetzold and Schmidt (1993). The upper Chyulu Hills forage resource was communally used for livestock grazing and browsing. Catha edulis, a bush whose tender twigs are commonly chewed by people is also found in this resource base and some people made good use of it in earning some money by selling this product to people living in towns down hill and sometimes those along the Mombasa-Nairobi highway. Other uses of this resource base included charcoal burning and wooden material for household-base and construction.

Pre-relocation land use in Kalemchwani was also characterized by some form of traditional agro-pastoral system. Maasai people had allowed the Kamba people to own home base farm units where they carried out food crop farming such as maize, beans, cow peas, finger millets, sorghum and others as shown by studies done by Muthiani (1973), Mukhebi (1983) and Gitunu (1994). For livestock grazing, a wet and dry grazing system was adopted on the vast Maasai forage base. Other uses of this base, though not given much emphasis in this study included, charcoal burning, thatch grass, building material and medicinal herbs. Livestock grazing and labour was supplied by family members, especially men, based on combined grazing systems.

In an endeavour to modify the broken down subsistence systems following relocation, land use in Muuni was characterized by exclusive use of individual farm bases. Every entitled householder owns 4 hectares of land on which crop and livestock production are confined. Farming involves growth of crops such as maize, beans, cow peas, green grams, pigeon peas, sorghum, finger millet, bulrush millet. Other food crops include cassava, sweet potatoes, pumpkins and gourds. A few farmers have attempted to grow vegetables such as okra. Household members provide farm Labour. Heavy and peak season farm tasks are usually performed by men and through ephemeral group, partnership and friendly efforts. Because of lowered ecological potential and unreliability of rainfall, perennial fruit crops are not being grown. Those who have attempted to do so have failed miserably. The majority of householders use simple hand tools. However, use

of the oxen plow is not uncommon although only a few farmers own both the plow and the beasts of burden. A labour exchange complex exists especially during land preparation periods, between households with oxen plow facilities and those who do not have the facility. The complex involves exchange of oxen plow labour for pasture, crop residues, food and cash. Occasionally a few farmers are able to hire tractor services. Grazing land is a limiting factor, as a result livestock structure, composition and species are adversely affected. Likewise, the grazing pattern is either unclear or non-existent. The majority of those who own livestock keep small ruminants and not cattle. Cattle survive by exploiting the Kenya Pipeline strip and sometimes by illegal grazing on the neighbouring Kenya Agricultural Research Institute (KARI) forage resource. Other areas of exploitation include the use of the oxen plow labour complex. This stress exists because according to Sadera (1986) the livestock carrying capacity in areas of similar ecological potential to Muuni is 15 acres per livestock unit. Muuni householders have only 10-acre plots. Small ruminants are also kept in small numbers and are usually tethered in householders' plots. Based on this account, it is justifiable to say that the relocation adversely affected farm crop production and livestock production as a result of reduced land area and lowered ecological potential. There are other areas where livestock was adversely affected. These include livestock watering, diseases, theft, nutrition and adaptability.

#### **8.1.4. Human and Livestock Health:**

Pre-relocation human and livestock health statuses were reported to be better than post-relocation one. The good pre-relocation health status was attributed to less disease incidence, forage abundance and quality nutrition. In the Chyulu hills, there were only very rare cases of contagious caprine pleuro-pneumonia (CCPP) and occasional epidemics. In Kalembwani, tickborne, CCPP and Nagana diseases were reported as rare. In Kibwezi, cases of CCPP and Helminths were there but uncommon. However, all the settlers reported severe cases of tickborne and tsetse-borne diseases. In addition, cases of helminths and CCPP were also reported. This was particularly severe during the first year of resettlement, as the environment was conducive to ticks and tsetse flies. As far as human health was concerned the presence of tsetse flies posed the danger of sleeping sickness but the real danger was posed by mosquitoes especially during the rainy season.

The approach to livestock disease treatment involved three methods, namely veterinary medicine and services, ethno-veterinary and para-veterinary. In the Chyulu Hills, ethno-veterinary and para-veterinary methods were commonly used. Veterinary medicine and services, ethno-veterinary and para-veterinary methods were used in

Kalembwani. In Kibwezi, people used the services of a veterinary officer who had an office nearby. At Muuni, para-veterinary and veterinary services were used. Human diseases like Malaria were treated at the nearby hospitals and dispensaries if they were serious or by use of the “over the counter” medicines if they were less serious. Those who could afford bought medicine from local chemists. Unfortunately for Muuni, all these facilities were either in Makindu or Kibwezi, about 14 km. away either way.

#### **8.1.5. Ethno-tolerance:**

To understand the changing social relations between individuals and groups, it is necessary to review the pre- and post-relocation situation of the non-Kamba ethnic groups. Only a few non-Kamba people lived among Kamba communities both in pre-relocation and post-relocation settlement areas. The number of each of these was too low to warrant a “community” title because none had exceeded 5. They were either individual persons, households or women married within the Kamba community. Pre- and post-social interaction between them and Kamba community was good. The only problem was the language barrier which was overcome after prolonged mutual co-habitation. Their occupation was mainly agriculture but some of them, like Kikuyu and Tanzania people had a strong affinity to business.

Pre- eviction Chyulu non-Kamba people included, Kikuyu, Taita, Kalenjini, Tanzanian, Luo and Mijikenda people. In Kalembwani, they were Tanzanian, Luhya, Luo, and Kisii people. In Kibwezi, they were Kikuyu, Embu, Nandi, Luhya, Samburu, Luo and Mijikenda people. Those settled in Chyulu mainly originated from Tanzania in the early 1960's after that country attained her independence (Mbithi 1975). Those settled in Kalembwani were either retirees or relatives of retirees who at one time were workers in the nearby sisal estates. Those settled in Kimbwezi were mainly civil servants or workers of the local sisal estate.

In Muuni, the non-Kamba people included Kikuyu, Taita, Samburu, Luhya, and Embu whose social interaction with Kamba people was good. Most of them were land buyers who had taken the opportunity to buy land during the second stage of Scudder's model, a stage in which people experience high level resettlement stress and are willing to sell anything at their disposal in order to continue living. As in pre-relocation settlement areas, non-Kamba people were mainly farmers but some, for instance Kikuyu, were also engaged in small-scale business.

### **8.1.6. Disputes and Dispute Solutions:**

Although people mentioned various ways, both customary and contemporary for solving social disputes, there were very few incidences of disputes mentioned. The ones that were often highlighted involved trespass on personal base property. One of the study respondents reported that he had a dispute with one of the neighbours at Chyulu Hills due to trespass on personal property. Although there were other cases of social disputes, respondents preferred to be quiet about them but were comfortable in talking about the procedure used to solve all possible disputes that could occur within the Kamba people as a community wherever they might be settled. My anecdotal evidence indicates that other social disputes existed even though people would not openly talk about them.

Contemporary formal law in dispute solution involves the office of the President's administrative line of command which starts from village elder stepwise to the Provincial Commissioner (PC). In extremely rare cases, the nation's Presidential power may be invoked to settle difficult disputes especially those involving land ownership if the parties involved deem that necessary. Police persons are used as the arm for arresting and prosecuting the culprits in the courts of law. On the other hand, customary law in dispute solution involves mutual agreements between the parties involved; clan members; parents; employers; and witch doctors.

### **8.2. Food Security Strategies:**

In order to understand the food security status of households as a result of the adjustment process a review of the strategies employed to ensure food security is made. Food security is the main concern of the people both in their pre- and post-relocation areas. Critical seasons for food security include drought and dry season periods and the severity depends on the ecological and weather conditions and rainfall reliability of the settlement area. Food insecurity alleviation strategies include:

- livestock/crop-related foodstuffs and food taboos.
- Government and External Aid Support.

These conditions are similar to what Coutts (1998) reports concerning the southern Sudan communities who have been devastated by war, droughts and famine.

### **8.2.1. Livestock/Crop-Related Foodstuffs:**

- ◆ To understand the changes in the role of livestock in the subsistence pattern, its contribution to household income and food security in relation to crop production and off-farm activities, the ensuing conclusive review is made.
- Crop and livestock related foodstuffs were the two main sources used by people to alleviate food insecurity during pre- and post-relocation eras. However, the food insecurity was absorbed easily in the pre-relocation areas due to favourable production conditions that supported sufficient household food production at least for household subsistence if not for sale too.
- Livestock related foodstuffs in Chyulu and Kalemwani included meat but not on a regular basis, milk on a regular basis, and ghee especially during milk production peak seasons. However, at Kibwezi, these included meat and milk, but not heavily depended upon. Kibwezi people did not have an adequate forage base to support cattle. Their small ruminants depended on browse that grew on a lava flow area. Lava flow areas do not support enough grass growing for cattle grazing.
- Livestock-related foodstuffs in Muuni were almost non-existent. The only fairly dependable animal protein source is chicken. If the morbidity of an animal is considered terminal, such an animal is slaughtered for meat. Sometimes dead animals are eaten. When the bull of one of my study technical assistant died in 1997, people ate it.
- It must be emphasized that livestock are treated as fixed deposit accounts which must not be withdrawn unless it is a matter of life and death. In analogy, livestock are not supposed to be slaughtered for household meat requirement. Rather than slaughter them for food, people irrespective of their settlement areas, prefer selling the animal for money to meet multiple household basic needs including a kilogram or two of meat from a local butcher should that be necessary. Otherwise, slaughtering animals involves very special occasions, such as clan annual meetings, circumcision ceremonies, matrimonial ceremonies, political rallies and special holidays. But even during these occasions in not all cases are the animals slaughtered. If animals must be slaughtered the decision to do so is dependent upon the household's livestock numbers, structure and composition; area of resettlement; the prevailing human social relations with their neighbours; and popularity of the political machinery. People obviously exploited other opportunities for getting livestock-related foods. These



were buying ghee and sheep fat from their immediate neighbours or neighbouring communities.

- Crop-related foodstuff is the most important source that is depended upon on daily basis. Gitunu (1994) had shown that 75% of the total household income on a day to day basis had come from food production within Makueni district. Some variation was reported in the types of food grown in pre-relocation and post-relocation areas.
- Traditionally, Kamba people grow similar food crops of which the most important are ranked in descending order as maize, bean, cow peas, green gram, pigeon peas, sorghum, finger millet and bulrush millet. But in addition to these, other pre-relocation foodstuffs were reported for Chyulu Hills as perennial fruit trees such as banana, pawpaw, lemon, orange, mangoes and guava (Mollison, 1979). Other unique foods grown included vegetables such as cabbage, carrots, pumpkin; groundnuts, Irish potato, arrowroots and sugarcane. In Kalemwani, pre-location food crops were usual traditional ones but some great importance was attached to cassava and pumpkin. However, in Muuni, although at first people attempted to transfer and plant food crops of their pre-relocation areas, they failed miserably. The only crops which adopted well under normal rain were the Kamba main traditional ones mentioned above. Pre-relocation crops in Kibwezi were similar to those grown in Muuni. Individuals always try to grow other crop varieties irrespective of the resettlement area and success of such crops. Some of these are kales, okra, black bean, sweet potatoes and cassava.

### **8.2.2. Wild-Related Foodstuffs**

- ◆ Wild food though not usually used by adults under normal circumstance contribute a small fraction to the Kamba community food security especially in times of extreme hopelessness such as a prolonged dry period or drought. For example in February this year there were reports of the death of people and eating of wild fruits in West Pokot District of Kenya. ( Nation Correspondent (1999) )
- Comments concerning wild fruit were that they only belong to children or occasionally to those looking after livestock in the bush. There were some common wild-related fruit, vegetables and edible roots across the pre- and post-resettlement areas. However type of species their composition and abundance vary according to area of settlement. For instance, pre-relocation Chyulu wild vegetables varieties were many and consistently mentioned by Chyulu FGD more than any other settlement area. This is understandable given the better Chyulu climate which persisted quite well

throughout the year and year after year. In Kibwezi, there were a few wild fruit mentioned that were not in other settlement areas. They are the fruit obtained from trees growing on the banks of the permanent Kibwezi river. Muuni wild crop food resource was diminishing since all trees and bushes are almost finished within the scheme. The only wild food can be found within the KARI research facility but was not exploited freely for fear of trespass and consequential court cases and fines or imprisonment. Another factor affecting the species composition and abundance is the aridity nature of Muuni. Kalembwani species were intermediate among other settlement areas, except for the edible wild-related roots which were more prevalent than in other settlement areas. This prevalence can be explained by the fact that these people lived among Maasai who make good use of their rich vegetation resource to exploit edible roots, either for medicinal or use in meat soup and beer brews.

- Among wild food is also game-related meat. Game animals are protected in Kenya and those who want to use them for meat can do that either by obtaining a hunting license or by carrying out illegal hunting and risk arrest and prosecution. The latter is the method, which was used by the respondents of this study across all settlement areas although the degree of hunting/snaring varied with the settlement area. People therefore did not want to talk much about it and I had to use an anecdotal approach to get the true picture.
- Three of my confidants discussed with me about what was involved in game animal meat affair. Let me call them Mr. X, Ms Y and Miss Z.
- \* Question: Mr. X why do people not want to talk about game meat in our discussions?
- \* Answer: First of all, they fear you because you are a government worker. Game hunting is illegal and from time to time the Kenya Wild Service (KWS) personnel patrol around to see if hunting or trapping is going on. Since these people are also government workers like you respondents think you are one and the same.
- \* Question: Mr. X in your own experience would you say there is game hunting and trapping?
- \* Answer: Yes, here in Muuni there is hunting and trapping going on especially in the night. People use high-powered spot-lights and bleating horns to confuse such animals like antelopes, especially dik-dik. This activity happens in the KARI research facility

and on the lava flow area. Also children mainly trap birds and other small mammals like squirrels.

- \* Question: Mr. X I understand your pre-relocation area is Kalembwani. What can you say about game hunting there?
- \* Answer: It was a big thing there. There were very many big game animals in the Maasai land. Maasai themselves do not eat game meat since they have a lot of livestock. We used to go on hunting expeditions and use poisoned arrows to quickly bring down the animal. We would be careful and watch out for the KWS personnel. If there was imminent danger of arrest by KWS personnel, we would hide our meat in bee log hives and hang them in trees. Thus a casual observer would only see a bee hive hanging either with bees making their honey or empty waiting for bees to lodge in. If the KWS personnel took us by surprise unexpectedly in our homes, our wives would collect all meat cuts and cover them with their dress as they sat down. When the KWS personnel finished searching the whole house, he would leave convinced that there was no hidden game meat.

The following discussion ensued between me and Ms. Y

- \* Question: Ms. Y, I know your pre-relocation area was Chyulu. What can you say about hunting and trapping in Chyulu Hills and here in Muuni?
- \* Answer: Here in Muuni, hunting is not a big thing, however people lay wire snares in the KARI research land with the hope of trapping dik-dik or any other small antelope. However, In Chyulu Ngulia people (the first to have ever settled in these Hills) were mighty hunters since their lifestyle was based on hunting and honey collection when they arrived there first. During our pre-relocation habitation they were still hunters and trappers but did not do it openly for fear of authorities. Unfortunately, they also hunt monkeys and eat their meat. Sometimes, they come with their game meat to Muuni to sell to people. Some of us are cautious for fear the meat might be from monkey. Monkey looks like a human being and eating it is like eating another human being.

The following discussion ensued between Miss Z and myself:

- \* Question: I understand your pre-relocation area was Kibwezi. Did the people in Kibwezi hunt or trap game animals for meat?
- \* Answer: People in Kimbwezi were mainly casual workers in the town. There were many butcheries in the town and people bought meat from there. If there were hunters or trappers they would probably hunt for small mammals like dik-dik but they would do this in hiding for fear of police and KWS personnel who lived nearby.

It should be noted that Table 48 does not necessarily present the actual contemporary hunting situation but the traditional status based on the peoples' inner aspirations and recall of their past experiences.

### **8.2.3. Socio-Cultural Taboos Associated With Food Eating:**

- ◆ Food cultural taboos exist among the Kamba community regardless of their settlement areas. Most of the taboos are associated with the Kamba community gender dietary habits especially the ones associated with eating animal-related food, mainly meat. There are a few unusual cases reported on crop-related taboos. These taboos are not strictly adhered to in our contemporary times.
- Among all the meat-related cultural taboos, eating of animal head meat and its other organs such as tongue receives highest attention. Head meat is said to be exclusively for men and that it is purely men's discretion to give or not to give the remnant pieces to women after they have satisfied themselves. These taboos would apply even if the meat was from game animal or from a commercial butchery. Any woman found breaking the taboo was liable to a one goat fine. The behavioral patterns behind this strange and mystical attitude are explained in two main ways as shown below:
  - \* Men are entitled to have the head meat because they are the ones who dig and bury bodies of the dead people.
  - \* Men are entitled because they are traditionally household heads and have exclusive right to own livestock.

Other similar behavioral patterns pertinent to meat eating taboos are shown in Table 51. A casual look at them show that they were coined to deprive women the right to prime animal cuts.

Crop-related food eating taboos were not many. Furthermore, the few that were mentioned were lopsidedly towards Kalembwani men. This is not a surprise because Kalembwani people as a group contain oldest members within Muuni community because their pre-relocation history in Kalembwani dates back to 1930's versus 1970's for the other Muuni groups. Their affinity and adherence to socio-cultural taboos is therefore expected to be more pronounced than these other groups. What is worth commenting about food eating taboos include the fact that traditionally, men are supposed to have special gruel and milk containers (gourds) exclusively to themselves. Use of the contents of these containers by other household members is purely men's prerogative. There are a few other taboos as shown in Table 51. Once again, these taboos indicate the denial by men of prime foodstuff to women, a state that should rightly be described as patriachal domination over women.

Happily for women, these taboos are gradually becoming obsolete with the passage of time. Some women study respondents suggested that it did not bother them to eat what is considered a taboo for them. Others said they would not eat what is a taboo for them at home but that it would not bother their conscience to eat the same at a market place. Furthermore, at least one woman respondent said that she did not believe in taboos and neither did she want to talk about them.

### **8.3. Government and External Aid Support:**

Aid, its delivery and its impact on social relations and values had a considerable input not only to food security and food security promotional ideas but also to social and infrastructural development. External aid, though not always and never on regular basis contributed a small fraction to community food security. It must be said here that this source was not heavily relied upon except in times of dire need such as prolonged dry period or drought. However, some agencies continued to make considerable contributory inroads to Muuni as a community as is discussed below:

- External agencies played some considerable role in helping people especially during their early resettlement stage in Muuni. Those agencies and the role they played within pre-and post-relocation areas is shown in Tables 39a. through to 39d. However, their help in Muuni was ephemeral because they did not take into consideration solutions to peoples' long term problems. This assertion is made due to the following main reasons:

- Lack of a reliable continuous program to cater not only for long term food provision but also for human health.
- Insufficient, piecemeal, unreliable and erratic provision of famine food relief.
- Lack of consideration for family household size.
- Lack of consideration for the infirm, elderly and single families.
- Lack of nutritionally balanced food provision.

A glance at the above mentioned Tables shows that Muuni was given more attention in comparison to pre-relocation areas. Agencies like AMREF and Government of Kenya were present in most of the settlement areas and people rated them according to what they did. For instance, AMREF was rated highly because of its continuous presence within the Muuni community. The only problem was that this NGO was a medical research body whose study objectives were confined within a specified conceptual domain concerned with the health of children below 5 years. Those who did not fall within that domain did not benefit directly.

As for the Government of Kenya, its endeavor to help its citizens is marked by the fact that it is present in all settlement areas. One credit given to the government is that it covers all households even though provisions are unreliable and erratic meager piece meals. Their rations are also notoriously and almost exclusively composed of maize grain alone. Provision did not consider social aspects of peoples' household size, age, health and marital status. Another external agency that made a memorable impact on Muuni was the Government of India. This government supplied every adult in the scheme 50 kg bag of rice, and some hand farm tools. The food was so much that people did not believe that it was being dished out freely. Some of them circulated rumors that all people eating this rice would die after the food was finished, hence the provision of farm tools like spade and hoe, needed to dig graves to bury dead people.

The presence of these agencies did not make a great impact in the pre-relocation areas for the obvious reasons described in this discussion. However, in times of prolonged food insecurity triggered by either demonic or non-demonic intrusions, aid provided by such agencies during those times was highly appreciated by the people no matter the meagerness of the rations or the unreliability of the provision logistics.

#### **8.4. Endeavor to Restore Disrupted Social Institutions and Production Systems:**

◆ The objective on the analysis of changing social relations between individuals and groups resulting from relocation to semi-arid areas and the consequent modification of the subsistence systems has a bearing to what ensues in this section. Having discussed how the relocation effected peoples' survival systems, this section discusses how the same people struggled to reconstruct those systems as they adjusted themselves in what seems like the second stage of Scudder's model. The discussion is based on the message given by 30 case studies drawn from Chyulu Hills and Kalemwani communities. The following topics form the basis for discussion:

- Restoration of Social Institutions
  - Transfer Stage
    - \* House types
    - \* Household family members
    - \* Livestock
    - \* Household goods
  - Building community social Institutions
    - \* Administrative Systems
    - \* Schools
    - \* Churches
    - \* Markets
- Restoration of Production Systems
  - \* Bush clearing
  - \* House construction
  - \* Land tillage
  - \* Livestock management
- Resettlement Setback
- Perceived Pre-relocation Planning Strategies
- Short and Long Term Peoples' Future Aspirations

##### **8.4.1. Restoration of Social Institutions:**

- Restoration endeavors for social institutions focus on the description about how people went about transferring to Muuni and building up their disrupted social systems. This has a bearing to the second stage of Scudder's model.

#### **8.4.1.1. Transfer Stage:**

- People transferred their traditional house types with them. The Kamba house type is usually made of round or four-sided wall. The wall structure is made of wooden posts tied together with wooden rails. Instead of stone or bricks, mud is put between the posts and rails to make a solid but weak wall when it dries. The roof is made of wooden trusses held together by thin wooden rails. The roof is then covered by thatch grass. This is the type of house the majority of Muuni community transferred from their pre-relocation areas. This does not mean that a few of them did not have permanent or semi-permanent houses before coming to Muuni.
- On becoming aware of the shift, people adjusted differently in shifting their families to Muuni. But what is noteworthy is the fact that livestock played a major role in the transfer stage. It was like when someone withdraws his mature deposit account to invest in an important project. By analogy, people sold their livestock to facilitate transfer and the initial resettlement process. Some traveled at once with all the family members whereas some household heads traveled alone, first to view the land and where possible clear some bush to put up a makeshift hut and a small farm. The former case was more prevalent with Kalembwani people while the latter was for Chyulu people. The reason for this is that Kalembwani people were expected to leave at once and were given a two-week dead line to do so. Some of them hired rooms in the towns along the Mombasa-Nairobi highway near Muuni. The latter case fits well for Chyulu people who took their time to shift. One of my study respondent had to leave two of her children for one year to await national school examination. The explanation for this is that for more than 5 years Chyulu people had dwelled in makeshift houses in towns in the foothills of the Chyulu Hills because unlike Kalembwani people, they had not been given a shift deadline date. Household heads therefore could afford to leave their families in the shanty villages while viewing and constructing new makeshift houses on their new farms. Most of the women-headed families shifted with all their families at once.
- Almost every householder who owned livestock in pre-relocation areas trekked them to the new settlement area. Kalembwani people had more livestock to trek than Chyulu people. The reason for this is twofold. First in their pre-relocation areas, Kalembwani people owned more livestock than Chyulu people. Secondly, they still could hire grazing from Maasai people even though they themselves were no longer permitted to put up homes there. Thus their livestock numbers remained high. On the



other hand, the prolonged shanty dwelling of the Chyulu Hills people following eviction dwindled their livestock numbers because they were no longer permitted to graze in the Chyulu hills any more. In fact some people engaged in illegal grazing at night.

- Most people used public transport to transport their household goods including chicken. Most of their goods were either lost on the way or got broken during the shift pandemonium.

#### **8.4.1.2. Building Community Social Institutions:**

- This section gives a conclusive description of what happened in relation to building of community social institutions by the Muuni people as individuals and as a community.
- Muuni was delineated into Blocks and Villages. There were five blocks and 17 village during the course of this study. This necessitated formation of administrative offices of which the highest was headed by an Assistant Chief. Each village was headed by a Village Elder. The majority of these elders were appointed by the Assistant Chief. A few of them were elected by the villagers themselves. The Assistant Chief was temporarily appointed by the area Chief. His appointment was subject to confirmation by the Office of the President, something that happened late in 1997 as this study was continuing.
- People started constructing temporary schools as soon as they arrived at Muuni. Some of the former KARI livestock holding facilities, used by KARI livestock herders before adjudication of Muuni, were converted to schools. A good example is at Ilatu, where the Assistant Chief's office is situated. External agencies had a considerable contribution toward construction of schools. The fact that schools are at the fledgling stage is evidenced by the fact that almost every parent is supposed to attend without failure, school work which is normally done every Tuesday and in some rare cases every Friday in all Muuni primary schools. Failure to attend is liable to a fine agreed upon by the Parent and Teachers Association (PTA). Unfortunately, there is no secondary school at Muuni.
- Apart from describing what happened in this paragraph, a changing in social relations and values is alluded to. Makeshift churches started coming up when people started socializing in matters of religion. A good example is given by one of the pastor who originated from Chyulu but had lost his followers as a result of eviction and random allotting of the land. Every morning he would stand on the road and preach to passersby. With time, he was able to attract quite a group of people, enough to start a

church group. Next they approached the county council representatives and acquired a plot where they erected a temporary church. There are several church groups in Muuni. Apart from worship they also help their needy followers in time of sickness, either by contributing hospital money or by providing farm labour.

- Restoration of markets is evidenced by kiosks scattered all over Muuni. At Ilatu shopping centre, there are quite a number of shops, hotels, a bar and a maize mill. There are other shops which have gone dormant or which operate according to whether the season is good or bad. They start operating in a good season and go dormant in a bad season. Obviously this would be understood in the context of people having purchasing power in good season. The same case applies to other kiosks found in Muuni. The major market outlets are found outside Muuni of which the most popular one is at Makindu town, about 14 km away from Ilatu.

### **8.5. Restoration of Production Systems:**

- Restoration of production systems involves a grueling adjustment process which put people into heavy farm tasks under extremely harsh conditions in order to start making a living in a new scheme of Muuni. This is done in the spirit of growing crops and also managing their remnant, meager livestock numbers, a practice dearly cherished by Kamba people as a community.
- Apart from describing what happened in this paragraph, a changing in social relations and values is alluded to. Bush clearing was the first major task people were involved in on arrival at Muuni. To do this, men formed temporary working groups or worked on friendly terms or in partnership. Women also helped in bush clearing but their labour input in this task was considerably lower. Simple hand tools such as machete, axe, hoe and spades were used. The initial purpose of bush clearing was twofold. First it was to clear a compound for putting up a house and secondly, to open up a small family farm. This would obviously be expected as an initial readjustment process described by McMillan (1993). The cut trees were made into charcoal which found a ready market on the near-by Nairobi-Mombasa highway.
- Types of houses constructed were very temporary to begin with. Quite a good number of Kalemwani people had hired rooms in the nearby highway towns. This was expensive and for that reason simple temporary houses were needed to settle the household family members and alleviate the room rental cost. It was during this process that people underwent severe stress due to lack of nearby water, attack on their livestock by ticks and tsetse flies, lack of foodstuff for the household, human

diseases caused by insect bites and general body weakness due to labour exertion and lack of proper diet.

- Apart from describing what happened in this paragraph, a changing in social relations and value is alluded to. Land tillage followed, using mainly hand tools such as those mentioned in the foregoing paragraph. This was again a tedious job since it involved removal of the virgin rooting systems. All household members were involved in this task. Household crop farm size depended on the size and age of the household family members, socio-economic status and level of education of the householder. The bigger the family and the greater the number of young adults, the bigger the crop farm opened. On the other hand, people with oxen ploughs and money to higher labour opened bigger farms. People with higher education did not only open bigger farms but also had practical expertise to exploit dryland farming techniques (see section 8.11 in support). Self-help groups composed of familiar pre-relocation individuals were formed to help in this task. With the passage of time and as people started becoming familiar to each other, other pre-location unfamiliar individuals started to join these groups and eventually they attained a village-level self-help group status. This agrees well with Scudder's model at the second and early third stages.
- A change in the role of livestock in the subsistence pattern is alluded to in this paragraph. Livestock keeping and management was severely affected by many factors. The severity depended on the seasonality. The drier the season, the worse the conditions for livestock nutritional welfare and vice versa. It must be noted that even during the wet season, the land base was too small to support adequate forage resource warranting an ideal agro-pastoral nexus. To start with we must understand first, that the livestock numbers had been reduced during the transfer process when they were sold to raise transport money and the remnants found their way to market to raise money for supporting the fledgling households. The remaining dwindling herds and flocks faced challenges such as tsetse fly- and tick-borne diseases which were very rampant at the early stage of resettlement due to the wild nature of the virgin bush land. The virgin bush was the home of big game animals such as buffaloes, eland, zebra and giraffe among others. These conditions are ideal for the survival of those disease carrier insects and worms within ecological habitats of this zone. Most hard hit were cattle although small ruminants had their toll too, especially from worms. Insufficient forage both in quantity and quality and also lack of nearby water was another setback for livestock keeping. This can be understood in the context of household land holdings which were too small to accommodate both farming and livestock keeping. Furthermore water was a big problem in the entire scheme. Those

who owned cattle were forced to trek long distances in search of water. Those who owned small ruminants were forced to share family domestic water with them. To make the matter worse, this water was mainly available on a cash basis. Households owning cattle exploited several opportunities to maintain their herds, such as pasture hire, crop residue purchase, plow labour service in exchange with pasture and crop residues, grazing on the Kenya Pipeline land strip, use of lava flow area scanty forage and risking illegal grazing on the neighbouring KARI research facility. Those who owned small ruminants preferred to tether them on their own land rather than shepherd them the whole day. This can be understood in the context the numbers being too small to constitute flocks. The majority of the households owned only two or three small ruminants. For this reason, householders found it uneconomical to use a whole day's labour to shepherd only a few animals when better labour opportunities existed in the form of farm work, charcoal making, casual employment, small-scale business, just to mention a few.

#### **8.6. Resettlement Setback:**

- One major factor that complicated the resettling process was the fact that there was a prolonged lack of rain. The only rainfall worth noting came during the second rainfall season of 1992 (October-December). This was supposed to be a blessing for a newly settling community, so to speak. Unfortunately, the rain found people in the following pitiable circumstances:
  - Temporary houses started to leak and the walls started to collapse due to wetness caused by rain, thus causing household family members misery of an unprecedented nature.
  - Diseases became rampant, malaria for humans and pneumonia-related for livestock. Many people lost their lives during this time. One household of a man and his wife was wiped out in one village, even though their son was living in another village within Muuni. Some people sold their farms and left for good. Likewise, livestock were affected.
  - Although rain is a blessing in food crop production, householders had only opened small farm portions when this rainfall came. Because of the resettling confusion, strategies for seed preservation or purchase had not been fully restored. So people were found in poor situation in terms of amount and

variety of seeds. This situation led to low crop harvests despite adequate soil moisture.

- As a result of the above three reasons, rainfall did not solve peoples' initial resettlement stress. Furthermore, there was no other substantial amount of rainfall for a long period, until the short rainfall season of 1997, which was marked by abnormal unique characteristics of what was popularly referred to as the *EL-NINO* phenomenon, a demonic intrusion which had its advantages and disadvantages in terms of increased crop yields in 1998 harvests on the one hand and crop rotting, and increased diseases on the other. As a result of waste due to rotting and sales to raise hospital money, food storage was ephemeral despite heavy harvests. By January, 1999 as the analysis of this study was yet going on, the Muuni community and indeed the whole of Kamba land was suffering from hunger as reported by Odalo (1999). To quote his words,

*In the three Districts of Ukambani, the hunger is a surprise as it comes soon after a huge harvest. A Nation team visited the area to establish what happened and how bad the situation is. BOB ODALO confirms that the picture is grim and is likely to get a lot worse in the short term.*

As reported by the foregoing team, their inquiries established two factors as being mainly responsible for the state of affairs. Firstly, the farmers sold their harvests to business men from outside literally at throw away prices. Secondly, the El-Nino rain came with its side effect. People succumbed to typhoid/Malaria and had to sell their harvests to treat the disease.

The unusually high rain can be said to have a bearing in the social relations due to the fact that business people from other areas took advantage of increased harvests and human diseases to buy food (especially maize) at a throw away price. In view of this, it is apparent that even if the rain is abundant in Muuni, other support systems, such as hospitals and improved marketing systems would be necessary in order to make Muuni a sustainable community.

The rain had social value bearing in the view of the fact that people endeavoured harder to obtain all varieties of planting seeds (especially the pulses) in order to take

advantage of the rain. There was no notable increase in purchase of livestock .This indicates that the role of livestock in subsistence pattern assumes a minor position in relation to crop production following relocation and change of land tenure system within semi-arid areas of Kenya.

As can be understood from the foregoing, food security was momentarily not a problem but this satisfaction was ephemeral in nature. However, rainfall of this nature is not expected to come every year and therefore the above experiences are ephemeral in nature. Nevertheless, this rainfall registered an indelible memory in the minds of the people of how Muuni would be like with sufficient precipitation.

El-nino rainfall can not be related to the relocation discussed in this thesis because it was a demonic intrusion that affected more than one country at the same time.

### **8.7. Perceived Pre-relocation Planning Strategies:**

- ◆ The major issues arising in peoples' minds concerning this inquiry point to what the government should have done prior to eviction of people from their pre-relocation areas. As suggested by the study respondents, the issues include the need for the following pre-planning provisions:

#### **8.7.1. Suggested Pre-planning Provisions:**

- The following actions as perceived by the respondent themselves had not been included in the Muuni settlement scheme, but should be in similar cases in future.
- Shift notice should have been issued in good time to allow people ample time for preparation.
- The government should have prepared at least 5 acres of farm for each allotted householder.
- The government should have allotted bigger land portions.
- Transport support during the time of shifting to Muuni should have been made available.
- Opportunity for household heads and strong men to come to Muuni first and prepare the land while in the mean time other less strong household members are permitted to stay on in the pre-eviction areas should have been made possible.
- Water, schools and health centres/clinics should have been put in place.

### **8.7.2. Implication of the Suggestions:**

- Although they did not resent the relocation from Kasikeu area to Mtito Andei due to the fact that it was purely voluntary, Gitunu (1994) nevertheless shows that people underwent socio-economic stress as they continued to adjust to new farm management skills and lifestyles associated with sedentary social and economic factors. This experience based on the Kamba people indicates that there is a stressful experience associated with relocation which calls for a change in the social relations and values. In case of the Muuni community, this study has shown that the stress was considerable and in fact proved it to be of the worst type among other relocation types given the fact that the relocation was involuntary and in the absence of prior planning. Furthermore, like adding insult to injury, the bulk of the Muuni community was not persuaded to leave their former settlement areas, it was forcibly evicted. The pre-planning aspirations suggested by the Muuni people are like a cry over spilt milk. Even if such aspirations had been met, they by no means would have become the panacea for solving all problems associated with relocation but surely, they possibly could have reduced the impact of the relocation shock that the Muuni community had to contend with and whose image and trauma is permanently and indelibly stigmatized in their memory.

### **8.8. Perceived Short and Long Term Aspirations:**

- The following improvement areas were perceived and suggested by the study respondents based on their short- and long-term aspirations. The problem areas include water, health and schools mainly. Other problem areas too which relate more or less to these three. The ensuing sections shed light to what people aspired:

#### **8.8.1. Envisioned Immediate Improvement Requirements:**

- Water is rated highest in peoples' required improvement mental list. This is followed by health centres, schools, polytechnics, cattle dips and others such as bursaries for secondary school children, provision of soft loans, waiver of the hospital cost-sharing program and of the 10% tax levied on the value of the land allotted to each of the Muuni resettled householders. This can be understood in the light of the financial hardships people face and the cry for help from any well-wisher to support systems that contribute to their very basic needs as a community notwithstanding their household needs.

### 8.8.2. Future Achievement Aspirations:

- Following relocation, people aspire to achieve many things on a short term basis and this in turn shape their changing social relations and values. In the case of Muuni the aspired achievements rotate around three major aspects, namely business, houses and livestock.
- People view engagement in business as the panacea for their economic problems. Owning and operating a kiosk business was peoples' priority number one though there were other business venture aspirations, such as trade in livestock, second-hand clothes and maize grain. The reason for this is seen in the light that generally business persons enjoy social and economic prominence in any society. However, not all business persons are prosperous. In Muuni, many kiosks were not in operation most of the time. Yet almost every study respondent aspired to start a kiosk business. As in the case of a spectator and a player, Muuni people think they would be successful in business unlike their closed-down folks. Another reason is the fact that during hardship periods, people depend heavily on these kiosks for food on the basis of the following exploitation: cash money, credit, overpricing, pledges, mortgages, sexual blackmail and barter trade. As kiosks operators continue exploiting people thus, they accumulate tangible wealth within the community, a cause for resentment and envy by the poorer majority of the community. In this context, it is understood why people wish to start kiosk business.
- People want to own better (or in other words *semi-permanent*) houses. The walls of a *semi permanent* house in Kamba's rural life's context is made of wooden posts, rails and mud. The roof is of corrugated iron sheets. Corrugated iron sheets for roofing and roofing nails are the two limiting factors to a semi-permanent house. Some people owned semi-permanent houses in their pre-relocation areas such as Chyulu. It had taken them many years to save enough money for such houses. They therefore know how hard it is to build a semi-permanent house in their prevailing predicament. Furthermore, as this interview continued, there was heavy rain (El-Nino) going on and many grass thatched houses must have been leaking, making peoples' lives miserable. Hence their mind must have been preoccupied with wishful thinking for better houses.
- Changes in individual and group values and attitudes toward animal husbandry is alluded to in this section. Livestock ownership is a criterion used to measure households' social status in the traditional agro-pastoral nexus. Though it had become



hard to own and manage herds and flocks of any considerable size, composition and structure under Muuni conditions, peoples' sub-conscious minds could not separate them from their traditional attachment to livestock. A considerable number of people in the community yearned to buy some livestock if they had money. Additionally, people owning livestock, especially cattle, were often suppliers of milk in the community and this fetched them money, a cause for envy by others. This is evidenced by one farmer who owned some cattle and earned 9,934 Kenya shillings from milk sale in the course of this study.

- Long-term hopes for aspirations revolved around major items of capital investment such as oxen ploughs, business plots, acquisition of new land and permanent houses. Sadly though, only a few people mentioned these long-term aspirations. Most study respondents and especially Chyulu women and Kalembwani people said that their future was unknown. They therefore did not want to comment on their long term aspired achievements.
- Oxen ploughs are viewed as premium farm tools by the Muuni community. The minority who own them are able to expand and prepare their land in good time. Additionally, they are hired by other people for money. Most people think that oxen ploughs improve soil moisture retention capacity and thus improve production. For this reason, it can be seen why some people aspire to own oxen plows as their long term survival strategy. But owning an oxen ploughs is one thing, owning oxen and being able to maintain them under Muuni conditions is another.
- Business premises are rare to find. People with business plots especially along the Mombasa-Nairobi highway are able to run successful business by exploiting the availability of transit goods and merchandise. Other people who own plots and run business progress well. At Ilatu one such had started with a kiosk and by the time this study was coming to a conclusion, he had almost completed a permanent business building on his plot. Definitely, people seeing this would wish to have their own plots and imitate their folks.
- A ten-acre plot is certainly not enough to support a household under Muuni conditions. Hence, it is understood why people want to own more land.
- People want to own *permanent* houses if they can afford them. The walls of a *permanent* house in Kamba's rural life's context is made of baked bricks. The roof is of corrugated iron sheets. This is the general framework but other niceties and projections can be added to it depending on individual's economic status and taste. Bricks are made locally. Water, sand, firewood and labour are required to make the bricks. Sand and labour are available either at the household or working group level

but water and firewood are limiting factors. Cement for mortar, timber for roof truss, corrugated iron sheets for roofing, doors, windows, nails and mason's labour costs are all limiting factors to a good permanent house. Some people owned semi-permanent houses in their pre-relocation areas such as Chyulu. It had taken them many years to save enough money for such houses. They therefore know how difficult it is to build a permanent house under their prevailing conditions. Additionally, they have seen some rich land buyers putting up beautiful and permanent houses. Furthermore, as this interview continued, there was heavy rain (El-Nino) going on and many grass thatched houses must have been leaking and mud walls collapsing making peoples' lives miserable. Hence their wishful thinking and aspirations for better houses can be understood.

#### **8.9. Overall Implications of Scudder's Model to the Study:**

- Stages 1 and 4 of the Scudder's model of social change and resettlement process does not apply to this study. The first stage of this model involves pre-relocation planning by the would be relocating agents. In this study no such planning was effected for the benefit of the relocated community. Stage 4 of the model involves handing and incorporating the community to the wider local communities and political systems. This step has a monitoring and evaluation connotations alluding to the first stage of the model hence it is not pertinent to this study either.
- Stages 2 and 3 of the model have some bearing to my study in the view of the fact that food security, social relations, social values and crop/livestock balances were affected by the relocation thus calling for the needed re-adjustment process. For instance, stage 2 involves settling in and transition. In my study this was evidenced by the fact that initially, the Muuni settlers were mainly concerned with meeting their subsistence needs by the act of opening bushes and making farms for crop production. They attempted to grow some of their pre-relocated crops and perennial fruit trees. Most of the perennial fruit trees, such as bananas, oranges, mangoes and pawpaws though did not succeed. On the other hand, they sold their meager livestock in order to buy food for the household and to use some of the money for farm labour and medical expenses. As far as social groups were concerned, people preferred to stick with their pre-location folks rather than other relocated communal groups whom they have had no prior contact with. They also transferred their farming skills and house types to Muuni although the initial house types were traditional simple typical Kamba houses. Stage 3 too has a bearing to

the study in view of the fact that the relocation stimulated a re-adjustment process which focused on social and development endeavour. Its applicability as far as this study goes is evidenced by the way people endeavored to formulate self-help groups, forming church groups, build kiosks and shopping centres and engagement in casual labour work. Further, peoples' aspirations for the future indicated that they were willing to take risks in business ventures; building permanent houses and business premises; buying extra land; and increasing their livestock. All the foregoing two stages agree quite well with Scudder's model. The only area of disagreement is in stage 2 where people move to new settlement areas with their relatives and neighbours. There was no laid down provision for the people to move with their pre-relocation folks and settle in one village or same settlement area and where this was possible, it was by mere chance. The reason for this is once again due to involuntary and unplanned relocation and random land allocation process. In contrast, Scudder's model deals with planned relocation.

#### **8.10. Gitunu's Unique 5-Step Socio-Economic Change Model:**

- This study of unplanned involuntary eviction and eventual relocation of agro-pastoralists into semi-arid areas of Kenya as evidenced by Muuni community in Makueni District can be described by a **5-STAGE SOCIO-ECONOMIC MODEL** as shown below:

- I. Stage one is an **Uncertainty, Frustration, and Kin scatter** stage. During this stage people lose personal property and communal social amenities and infrastructure to fire, damage, theft, looting and forfeiture. They become squatters and live in makeshift shanties installed in public and private areas such as shopping centres of the neighbouring communities or along the major highways and railway lines or any other area designated public land. During this time people are uncertain of their future, and they are frustrated as they see their resources such as livestock and other personal property dwindle as they find ways to market to raise money for household basic needs or as they are stolen or livestock die of diseases, dehydration and starvation. Further frustrations mount as they see education for their children facing adversity. During this time, some kin members scatter and look for better opportunities elsewhere thus

cutting off close mutual kin support system----a really uncertain and frustrating stage.

- II. Stage two is a **Land Allotment and Shifting Stress** one. During this stage resettlement area is identified by the sitting government and the land is adjudicated, demarcated, consolidated and registered to the squatters. Allotment is done by ballot papers thus causing further kin scatter and alienation to their close members. People continue to sell their remnant resources such as livestock in order to raise money for transport to new resettlement areas thus causing further dwindling to their very life supporting resources. Some households shift with their family members at once and hire living rooms in the nearby towns as they continue opening new farms and building temporary houses thus causing further economic difficulties as the hired rooms must be paid for promptly or risk facing eviction. Some male-headed households let their household heads shift alone first to view the new land and assess the possibility of opening new farms and building temporary houses. Female headed households shift at once with their household family members and struggle together as they open up new farms and build new temporary houses----a really stressful re-adjustment process.
- III. Stage three is a **Facing Ecological and Social Indifference Challenges** one. During this stage, human and their remnant livestock succumb to ecological challenges such as diseases, insufficient food and water supply as they continue to re-adjust themselves in their new environment. People view their new neighbours with suspicion at first due to lack of prior acquaintance. However, they seek support and consolation from their pre-relocation acquaintances.
- IV. Stage four is a **Settling In and Social System and Infrastructural Restoration** one. During this stage, people are mainly concerned about meeting their day-to-day household food security. They engage themselves in every possible cash generating farm and non-farm activities to ensure food security. They attempt to grow their pre-relocation food types and fail miserably in those that require a different ecological potential. Livestock production is overshadowed by crop production and other non-farm cash generating activities. At first most householders construct typical traditional temporary houses even though they might have lived in better semi-permanent or permanent houses in their pre-

relocation areas. Provincial Administrative order is set in to oversee peoples security, maintain order and inform people about prevailing political and technical affairs. As people get familiar to one another, social groups start to emerge first as farm working groups and later as community Infrastructural restoration groups. External agents are attracted by peoples' predicaments and assist either by supplying food in kind or by rendering food production promotional services. Research groups are also attracted to study various facets of a community undergoing a re-adjustment process following relocation.

- V. Stage five is an **Economic Development and Future Aspirations** one. During this stage, business-oriented people start acquiring business plots and premises, they construct temporary shops and kiosks and start small-scale business. Those who are socio-economically well-placed start milling business, buy oxen ploughs and on rare occasion tractors whose farm services are hired by others. Land terrain permitting, some people buy bicycles which they use for local transportation. Open air (*Jua-kali*) bicycle repair sites emerge (mostly under tree shades or simply in literal open air). Similarly open air small-scale fruit and vegetable business sites emerge and mainly run by women<sup>1</sup>. Short-term future aspirations are mainly based on starting small-scale business. Some people decline to state what their long-term aspirations are and those who do aspire to acquire superior farm tools such as oxen ploughs; develop business, acquire business plots; build permanent houses; increase farm area size, buy new land and increase livestock.

#### **8.11. Agro-pastoral Practice as Measured by a Farm Recording Exercise:**

- In view of the fact that the objectives of this study seek to improve our understanding of the role livestock production plays in socio-economic processes of change and make us understand changes in its role in the subsistence pattern and its contribution to household income and food security in relation to crop and off-farm activities, the measurement of farm activities and their analysis shows that crop production-related and off-farm activities assumed a superior role in providing daily household food

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<sup>1</sup> As the field data collection for this study was coming to an end, at least one businessman had started a pub and another had opened a health clinic at Ilatu Assistant Chief's headquarters township. Talk was rife of people organizing themselves to tap water with the assistance of AMREF, bring this water close to people and charge a fee for anyone using it.

security. However, once in a while, especially in circumstances involving matters of urgent attention such as serious sickness, an animal would be sold, if at all it is available anyway, to cater for the emergency.

- It should be remembered that at Muuni, all holdings are of the same size, though the soil type is not the same throughout and rainfall, as recorded by the farmers, showed considerable variation over the area. Also, the size of families living on each holding, their age structure, educational standard and state of health varied from unit to unit.
- With regard to the value of produce, there are in general terms, many factors that are likely to determine this, including those mentioned in the previous paragraph. Thus soil type, rainfall and the availability of labour to tend the crops and animals all have a bearing. To these must be added the capacity of the farmers to make purchases of seed, fertilizers and other agro-chemicals, implements and livestock for it is accepted fact that, all things being equal, the more that is put into a farming system, the more will come out. It was with these thoughts in mind that the data on farm inputs and outputs in both long and short rain seasons of 1997/98 was analyzed as advocated by Friedrich (1977).
- Firstly, information on rainfall was taken into account. Unfortunately, though on-farm recording commenced in February 1997, it was not until mid-May that rainfall recording was started. This is unfortunate, given that early rainfall is likely to significantly influence the establishment of crops sown in the first few weeks of April, the usual start of the long rains.
- Secondly, soil type was considered on the only basis possible at the time, namely soil colour, as nothing was known about the fertility of soils in the Muuni scheme.
- Thirdly, labour was accounted for, being the number of hours committed to farm work from all sources. Initially only the quantity of labour was considered, aspects of quality at a second stage.
- Finally, purchases of all kinds were evaluated on the basis of cost, then all four factors were linked to the value of products through linear regression.
- In the long rains, the only factor attaining statistical significance was labour ( $P=0.001$ ), though purchases were close to the accepted significant value of 0.05 at 0.071. It might be concluded from this that soil and rainfall have no influence on farm outputs at Muuni, but clearly care is needed when interpreting such a bold statement. Thus all that can confidently be stated is that the study provided no evidence of a difference in fertility between red and black sandy soil that had a bearing on farm income. Detailed study of soil physical and chemical characteristic might well reveal differences between the two types, but the expectation is that any differences detected

would not have an influence on fertility and consequently on crop production and farm income. On rainfall the situation is even more contentious, for it goes without saying that in Africa in particular, variations in the quantity and timing of rain have huge influences on crop and livestock production. All that this study shows is that total rainfall seems not to have affected total farm output in the long rains. But included in total farm output are the values of livestock, fuelwood and charcoal, which are less likely to have been influenced by rainfall.

- Returning to the matter of labour, it should be noted that this term was found significant only for the long rains, not so for the short rains. Given its importance, at least for the long rains, attempts were made to describe and analyze it in terms of household structure (numbers of persons, ages, health status and wage earners, the demand for labour (acres cultivated, livestock ownership pattern) and such factors as the use made of hired labour, participation in group activities and the educational standard of the head of the household. Of these, educational level proved to be strikingly important. If this is true in general, then there are important lessons to be learned. It seems entirely plausible that the better educated are better placed to embark on money-earning activities, including farming, than those of lower educational standing. Also, a good education may well provide a better understanding of the basis of agricultural practices, open the door to current advice and information on improved practices (the capacity to read and understand advisory literature), and underpin logical thinking on the management of resources. In short, a well educated household head equips the family to work longer hours more effectively.
- Something of a dilemma is presented by the failure of the short rain data to support the idea that education is important, but there could be an explanation for this, connected with the weather conditions prevailing in the two seasons. In Kenya, the long rains are generally the more reliable and provide more water over a longer period. Those of 1997 did not come up to expectations; in contrast the short rains were exceptionally heavy (see Tables 57 and 58). It may be that education is important when conditions are difficult, a keen, developed mind being most useful when crop and livestock production is at risk. When there is plenty of rain, any body can grow a crop.
- Group membership and cattle ownership were also significant factors influencing labour-hours worked in the long rains and are easily understood. Thus membership of a group confers the right to call on other members for help on the farm and cattle have high labour demand.

- Purchases proved important contributors to farm outputs in the short rains. Given that in the long rains they did not attain statistical significance, and no further analysis was undertaken of this factor for this season. For the short rains, beans and cow pea purchases, which are high value crops compared to maize and sorghum, may explain the contribution of the former to improved farm income. In contrast, purchases of chickens and sorghum seed, which were also statistically significant, are hard to explain. However, cause and effect are sometimes difficult to distinguish in analyses of the type employed here and it may be that buying chickens and sorghum (for beer brewing?) marks the desire of the family to celebrate a good harvest!
- On the matter of rainfall and crop yields, studies were made of the effects on the two crops universally grown in the project area, maize and cow peas. As has been mentioned, the short rains were marked by heavy falls throughout and it was not possible to find any association between rainfall and yield, except a possible deleterious effect of very heavy rain at two farms which had much rain and poor yields (Figures 3d. and 3g.).
- In the long rains, lack of information in the period April 1<sup>st</sup> to May 14<sup>th</sup> hampered analysis, but as shown in Figures 3a. and 3c. and the associated chi-square analyses, there is good evidence that early rain is important to yield. This finding was not unexpected. Lack of rain in the final stages of the season prevented investigations of its effects from being studied.
- In summary the technical farm aspects may be concluded as follows:
  - \* The harder you work, the more money you will earn.
  - \* A good education enables the family to work more profitably under difficult conditions.
  - \* Membership of a community group has the advantage of the right to call on others for help, as well as the obligation to help others.
  - \* If you want an easy life, don't keep cattle!
  - \* Grow high-value crops for greater income.

The above should be considered with caution given the fact that they are based on research in a very unusual set of demonic intrusions such as prolonged dry spells followed by an unusual rainfall (El-nino).



## **8.12. Recommendations for the Future Relocation Strategies:**

- ◆ The relocation have had very stressful effects on peoples' social and production life. This came about due to the fact that peoples' pre-relocation lifestyles based on strong social ties and exploitation of vast and rich land resource base was disrupted. The situation was made worse by the involuntary and unplanned relocation process that left people almost destitute. People suggested that the government should have planned the relocation before hand and this is highly recommended.
- ◆ The 10 acre land allotment at Muuni Settlement Scheme was limiting both in size and production potential. The land was heavily infested with tsetse flies and ticks, the carriers of the diseases that almost decimated their remnant livestock. It was impossible for the families to make a reliable living from the land given that their production background is based on agropastoralism. In the endeavor to survive under Muuni conditions some householders have illegally (on the basis of willing seller/buyer) sold out portions of their land and have also cut down all the trees for commercial charcoal making. This practice has made their lives in Muuni even worse. The trend of the ecological amplitude is toward doom and so are the inhabitants thereof. People yearned and strongly recommended future bigger portions of land in the event of relocation to harsh ecological and weather aspects that characterize Muuni.
- ◆ Water is the major limiting factor in this scheme. People cry for water all the time. If domestic water is supplied to the community, it would only solve a small portion of their present hopeless situation. What is needed and strongly recommended provision of sufficient water to support both their domestic and production needs. People identified three permanent sources of water which could be tapped to solve their water crisis. These were Kilimajaro water, Omani water and River Makindu water.
- ◆ Human health is also affected adversely as a result of the already weakened body systems (lack of adequate food both in quantity and quality) and the presence of disease transmitting agents such as mosquitoes, tsetse flies and typhoid in rainy seasons. People cry for a nearby health centre and waiver of the hospital cost-sharing system.
- ◆ The following recommendations are made.
- Education for the children is highly valued. Some schools are in despicable state. There are no secondary schools in the scheme. People cry for permanent primary schools and at least a secondary school and a village polytechnic. As this study has

shown, those of a higher educational standing are better placed to cope with the exigencies of the circumstances in which they find themselves. It is recommended that steps be taken to improve the literacy of the people, so that they can more readily access information likely to improve their lot.

- People endeavor to use every possible opportunity to support themselves. They do this by trying to form social systems geared towards maintaining cohesion of the households and of the community as a whole. They do this by forming self-help groups such as working groups, fund raising groups, farm working partnership, religious groups, small-scale business and school work parental groups. But given the unfavourable conditions of the scheme as already mentioned in the foregoing chapters, people cry for external help that would strengthen their technical and social support in order to make the system more sustainable. In absence of external back-up which would look into people's long-term survival strategies, Muuni community can not hold together for long, it will disintegrate. So external help is direly needed and recommended.
- When rainfall is favourable, people make good harvests but the storage of such harvests is ephemeral due to the fact that sales are necessary to raise money to cater mainly for health needs. Incidentally, diseases are rampant during seasons of peak harvests. Outside traders exploit the hopeless situation to buy the food at a throw away price. This makes the system more unsustainable. The need for well organized marketing systems so as avoid exploitation by opportunistic traders is highly recommended.
- It is recommended that planned future relocation should involve community and social workers (Slocum, 1995) during the relocation planning stage; minimise social inequality; give training on gender issues and social rights; and integrate dryland farming research which looks into the otherwise unpopular but well adapted dryland crops and livestock. Likewise, it is recommended that research on processing of unpopular foodstuff such as sorghum and other millets with the aim of improving their preferences, palatability and general appeal would not only encourage people to grow them but also would improve their marketability. Incidentally, these millets do relatively well compared to maize under harsh environments characteristic of Muuni.
- It is recommended that socio-anthropological workers be involved in the relocation process and in dry farming systems in order to have a deeper understanding of how the systems work in the changing land tenure, social relations and production practices triggered by the relocation. Only then can appropriate recommendations be

made so as to initiate meaningful research aimed at developing tangible economically appealing and socially practical technologies.

- The ultimate asset is land and while they work their 10 acres as best they can, the farmers of Muuni do not yet have the title to their land holdings. Perhaps the limiting factor is the 10% tax levied on the value of the land and which probably must be paid before land title deeds can be issued out. In effect this ties them to the spot, since they cannot sell their holdings should they want to, at least legally. It is strongly recommended that the waiver of the land value tax be effected and titles to land be conferred at the time of settlement.
- To single out the most unsatisfactory feature of the present scheme, it is the inequitable position in which the community finds itself. It does not enjoy the same rights as their countrymen and the pressure of the inequality imposed on them is likely to have serious consequences. It seems probable that given the slightest opportunity, members of the community will leave the area in search of better things. Moves to the city by the children of the present farmers can be expected. What will become of them there cannot be predicted; some undoubtedly will find success, but others may add to the numbers living in equally pitiable conditions in one or other of the numerous shanty towns. Surely to avoid future stress well planned and coordinated relocation methods and efforts are necessary.

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**APPENDICES:**

**ANTHROPOLOGICAL RESPONSES FROM CASE STUDIES ORIGINATING FROM  
CHYULU HILLS, MUUNI SETTLEMENT SCHEME, 1998**

Appendix 1a. Chyulu men/women, responses to "Situation before coming to Muuni", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

<b>Inquiry: Situation prior to Muuni residence</b>	<b>No. of men responding (n=10)</b>	<b>%</b>	<b>No. of women responding (n=5)</b>	<b>%</b>
<b>Q1. How was family situation prior to relocation?</b>				
R1 a. Happy and health due to ↑food ↓ diseases	8	80	5	100
R1 b. Somehow was happy and health	1	10	0	0
R1 c. Was the same as here	1	10	0	0
R1 d. Had two happy wives and children	0	0	0	0
<b>Q2. How was livestock situation prior to relocation?</b>				
R2 a. Healthy 7 cows-40 goats-9 sheep	1	10	0	0
R2 b. Healthy 5 goats	1	10	0	0
R2 c. Healthy 12 goats	0	0	1	20
R2 d. Healthy 4 goats-7 sheep-2 ass	1	10	0	0
R2 e. Had no livestock	1	10	0	0
R2 f. Unhealthy 38 cows-30 goats-15 sheep	1	10	0	0
R2 g. Healthy 5 cows-140 goats-17 sheep	1	10	0	0
R2 h. Healthy 6 cows-24 goats	1	10	0	0
R2 i. Healthy 34 goats	1	10	0	0
R2 j. Healthy 17 goats	1	10	0	0
R2 k. Healthy 25 goats	1	10	0	0
R2 l. Healthy 2 cows-10 goats-2 sheep	0	0	1	20
R2 m. Healthy unnumbered goats	0	0	1	20
R2 n. 10 goats	0	0	1	20
R2 o. 18 goats	0	0	1	20
R2 p. Healthy 1 cow-18 goats	0	0	0	0
R2 q. Healthy 5 cows-21 goats	0	0	0	0
R2 r. Healthy 30 cows-40 goats-25 sheep	0	0	0	0
R2 s. Healthy 3 cows-14 goats	0	0	0	0
R2 t. Healthy 15 cows-14 goats	0	0	0	0
R2 u. Considerable healthy 22 cows-40 goats-12 sheep	0	0	0	0
R2 v. Healthy 2 cows-12 goats	0	0	0	0
R2 w. Healthy 7 cows-5 goats-10 sheep	0	0	0	0
R2 x. Healthy cows and goats	0	0	0	0

Appendix 1a. Cont'd.

R2 y. Healthy 5 cows-20 goats- 3 sheep  
 R2 z. Had 30 cows-40 goats-20 sheep  
 R2 aa. Healthy 10 cows-15 goats  
 R2 ab. Healthy 5 cows-20 goats

**Q3. How were neighbours relations?**

R3 a. Relations were very good  
 R3 b. Relations were good  
 R3 c. Missing response  
 R3 d. Relation very good- thus fight Maasai raiders

	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	7	70	3	60
	0	0	1	20
	3	30	1	20
	0	0	0	0

Appendix 2a. Chyulu men/women responses to "period of residence in pre-shift settlement areas", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Period of residence in Chyulu Hills	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. How long was the residence in Chyulu Hills?</b>				
R1. Early 1930s to early 1990s	0	0	0	0
R2. Mid-1930s to early 1990s	0	0	0	0
R3. Late 1930s to early 1990s	0	0	0	0
R4. Early 1950s to early 1990s	0	0	0	0
R5. Mid-1950s to early 1990s	0	0	0	0
R6. Late 1950s to early 1990s	0	0	0	0
R7. Early 1960s to early 1990s	0	0	0	0
R8. Mid-1960s to early 1990s	0	0	0	0
R9. Late 1960s to early 1990s	0	0	0	0
R10. Early 1970s to early 1990s	6	60	3	60
R11. Mid-1970s to early 1990s	2	20	1	20
R12. Late 1970s to early 1990s	2	20	0	0
R13. Early 1980s to early 1990s	1	10	1	20
R14. 1981 to 1988	1	10	0	0
R15. 1990 to 1992	1	10	0	0

Appendix 3a. Chyulu men/women responses to "Ancestral dwellings before Chyulu Hills", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: The ancestral dwellings before Chyulu Hills	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Where were the dwellings prior to Chyulu Hills?</b>				
R1. Mid-Machakos zone	9	90	5	100
R2. From elsewhere	1	10	0	0
R3. Mid-Machakos zone (Mukaa area)	0	0	0	0
R4. Mid-Machakos zone (Mukaa area)	0	0	0	0
R5. Mid-Machakos zone (Kitaingo area)	0	0	0	0

Appendix 4a. Chyulu men/women responses to "Becoming aware of the Shift from Chyulu Hills", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Becoming aware of the Shift	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. When or how was the shift awareness alerted?</b>				
R1 a. Becoming aware in 1992	1	10	0	0
R1 b. Informed by chief in 1992	1	10	0	0
R1 c. Informed by Kenya Wildlife Service (KWS) personnel	1	10	0	0
R1 d. Informed by Chief	2	20	1	20
R1 e. Informed by District Commissioner (D.C.) through Chief	1	10	0	0
R1 f. Informed by Administrative Police (AP)	1	10	0	0
R1 g. Informed by Chief and KWS personnel	1	10	0	0
R1 h. Informed by Assistant Chief through Village Elder	1	10	0	0
R1 i. Informed by Chief in 1985	0	0	1	20
R1 j. Informed by Assistant Chief	0	0	1	20
R1 k. When houses were torched	0	0	1	20
R1 l. Informed by a visiting District Officer.	0	0	1	20
R1 m. Missing response	1	10	0	0
R1 n. Informed by D.C. Kajiado District	0	0	0	0
R1 o. Informed by D.Cs. Machakos/Kajiado Districts	0	0	0	0
R1 p. Informed by D.O.	0	0	0	0
R1 q. Informed by Provincial Commissioner (P.C.)	0	0	0	0
R1 r. Informed by D.C. Machakos District	0	0	0	0
R1 s. Informed by D.C.	0	0	0	0
<b>Q2. How was the preparation period?</b>				
R2 a. From one to four weeks	1	10	1	20
R2 b. From one to twelve months	2	20	2	40
R2 c. Between one and two years	2	20	1	20
R2 d. Over two years	1	10	0	0
R2 e. Only a short period	1	10	1	20
R2 f. Very difficult	1	10	0	0
R2 g. A long period	1	10	0	0
R2 h. Concentrated on transport planning	1	10	0	0
R2 i. From one to twelve months/sale of livestock	0	0	0	0
R2 j. From one to four weeks/sale of livestock	0	0	0	0
<b>Q3. What plans were made to enable shift to Muuni?</b>				
R3 a. Sell livestock for transport money	1	10	0	0
R3 b. Sell my livestock for money to build a new house	1	10	0	0

Appendix 4a. Cont'd.

R3 c. View the plot, clear bush/build a house	8	80	3	20
R3 d. Travel to Muuni upon availability of travel money	0	0	1	20
R3 e. Missing response	0	0	1	0
R3 f. Hired room-3 month at Mbuinzau/kept family in it	0	0	0	0
R3 g. View farm and build a house	0	0	0	0
R3 h. Sell livestock				
R3 i. Sell livestock/hire Room @ Kiundwani/view/build house	0	0	0	0
R3 j. Hire room/view plot/build house and clear bush	0	0	0	0
R3 k. Hire room and build a house	0	0	0	0
R3 l. View/build house/clear bush with some friends	0	0	0	0
R3 m. Defeat government's deadline for shift/build house	0	0	0	0
R3 n. Hire room at Kiundwani and build a house	0	0	0	0
R3 o. Do bush clearing	0	0	0	0
R3 o. Hire room at Mbuinzau/build house and clear bush	0	0	0	0
<b>Q4. What was expected on arrival at Muuni?</b>				
R4 a. Land, hospitals, piped water and schools	1	10	0	0
R4 b. Nothing was expected except land	8	80	2	40
R4 c. Nearby water and land	0	0	2	40
R4 d. Nothing but bushed land	0	0	0	0
R4 d. Schools, piped water and land	1	10	0	0
R4 e. Land, nearby water, hospitals etc.	0	0	1	20
R4 f. Missing response	0	0	0	0
<b>Q5. Did all family members shift together at once?</b>				
R5 a. All family members moved together at once	3	30	4	80
R5 b. House head moved first to prepare for the family	6	60	0	0
R5 c. First moved with some then went for the rest later	1	10	0	0
R5 d. All family members at once except some children	0	0	1	20
R5 e. All 3-month at Mbui-nzau	0	0	0	0
R5 f. All but stayed at Kiundwani first	0	0	0	0
R5 g. No: had hired room at Kima for them first	0	0	0	0
R5 h. All but had moved livestock first	0	0	0	0
<b>Q6. Were there lost or left behind personal property?</b>				
R6 a. Some property lost in transit/stolen or left behind	10	100	5	100
R6 b. No loss except some broken household items	0	0	0	0

Appendix 5a. Chyulu men/women responses to "New land acquisition process", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: New Land Acquisition	No. of men responding (n=10)	%	No. of women responding (n=5)	%
Q1. What process was used in acquiring new land at Muuni?				
R1. By ballot papers at Kibwezi D.Os. Office	3	30	1	20
R2. By ballot papers at Metava Shopping Centre	3	30	1	20
R3. By ballot papers	4	40	3	60
R4. By ballot Kalemhwani	0	0	0	

Appendix 6a. Chyulu men/women responses to "Land use plan" Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Land use plan at Muuni	No. of men responding (n=10)	%	No. of women responding (n=5)	%
Q1. Any change of land use plan on arrival at Muuni?				
R1 a. Formation of working groups to open new farms	1	10	0	0
R1 b. Build house, clear bush and increase livestock	1	10	0	0
R1 c. Did not change any plan	1	10	1	20
R1 d. Embarked on bush clearing as first priority	1	10	1	20
R1 e. Made use of oxen plow unlike in Chyulu Hills	4	40	1	20
R1 f. Started working for wage earning	1	10	0	0
R1 g. Started strip cropping for the first time	1	10	0	0
R1 h. Sold livestock to clear bush and build house	0	0	1	20
R1 i. Missing response	0	0	1	20
R1 j. Started making charcoal for sale	0	0	0	0
R1 k. Practiced dryland farming	0	0	0	0
R1 l. Could plan/manage owned land my own way	0	0	0	0
R1 m. Established friendship with new neighbours	0	0	0	0
R1 n. Embarked on a determined hard work	0	0	0	0
R1 o. Planned to open up land and find water	0	0	0	0
R1 p. Could plan/manage/work hard on owned land	0	0	0	0
R1 q. Could plan/manage/care for owned land	0	0	0	0
R1 r. Could hire tractor and improve soil	0	0	0	0

Appendix 6a. Cont'd.

<b>Q2. Was any portion of land sold or bought?</b>									
R2 a. Six (6) acres were sold	1	10	0	0	0				0
R2 b. Four (4) acres were sold	2	20	0	0	0				0
R2 c. Three (3) acres were sold	1	10	2	0	40				
R2 d. One (1) acre was sold	3	30	3	0	60				
R2 e. No portion of land was sold or bought	1	10	0	0	0				0
R2 f. Two (2) more acres were bought in addition	1	10	0	0	0				0
R2 g. Missing response	0	0	0	0	0				0
R2 h. Five (5) acres were sold									
<b>Q3. Pleased with own farm achievement so far?</b>									
R3 a. No: not pleased with my achievement so far	2	20	3	0	60				0
R3 b. Yes: only this year because of good harvest	4	40	2	0	40				0
R3 c. Yes: pleased but water is still a problem	1	10	0	0	0				0
R3 d. Yes: because of good harvest/green vegetables	1	10	0	0	0				0
R3 e. Yes: pleased with my achievement	2	20	0	0	0				0
R3 b. Yes: because of good harvest/plenty for sale	1	10	0	0	0				0
<b>Q4. What Changes would be made or suggested?</b>									
R4 a. Water development in the area	6	60	1	0	0				0
R4 b. Availability of Tractor farming service	1	10	0	0	20				0
R4 c. Soil conservation and water development	2	20	0	0	0				0
R4 d. Use of oxen plow in land preparation	1	10	0	0	0				0
R4 e. Buy more land	0	0	0	0	0				0
R4 f. Increase farming area and conserve soil	0	0	1	1	20				0
R4 g. Develop water, build good house/use oxen plow	0	0	1	1	20				0
R4 h. Use of oxen plow and water development	0	0	1	1	20				0
R4 i. Water development and build good house	0	0	0	0	0				0
R4 j. Water development and good business	0	0	0	0	0				0
R4 k. Water/oxen plow and employ farm hand	0	0	0	0	0				0
R4 l. Provide tractor service and develop water	0	0	0	0	0				0
R4 m. Develop water and provide oxen plow	0	0	0	0	0				0
R4 n. Develop water/increase land/provide oxen plow	0	0	0	0	0				0
R4 o. Provide water and increase land	0	0	0	0	0				0
R4 p. Conserve soil	0	0	0	0	0				0
<b>Q5. What are the immediate plans?</b>									
R5 a. Harvesting, land preparation and planting	1	10	0	0	0				0
R5 b. Harvesting and opening more land for farming	1	10	0	0	0				0
R5 c. Harvesting and planting	0	0	1	0	20				0
R5 d. Planting	1	10	0	0	0				0
R5 e. Start a kiosk business	1	10	0	0	0				0



Appendix 6a. Cont'd.

R5 f. Planting and selling food to start business	1	10	0	0
R5 g. Harvesting and Land preparation	1	10	0	0
R5 h. Harvesting	1	10	0	0
R5 i. Land preparation by removal of crop residue	3	30	3	60
R5 j. Land preparation	0	0	1	20
R5 k. Build new house	0	0	0	0
R5 l. Build kiosk at Kiundwani	0	0	0	0
R5 m. Land preparation/crop residue removal/planting	0	0	0	0
<b>Q6. Any learned new skilled labour?</b>				
R6 a. No: none except what I already know	4	40	4	80
R6 b. Yes: about planting methods	1	10	0	0
R6 c. Yes: from AMREF	3	30	0	0
R6 d. Yes: adoption of dry land life/farming methods	1	10	1	20
R6 e. Yes: from AMREF and MoA extension service	1	10	0	0
R6 f. Yes: adoption of dry land life/planting method	0	0	0	0

Appendix 7a. Chyulu men/women responses to "Description of work Activities", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Description of work activities	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Who does daily household tasks?</b>				
R1 a. Wife's and children's assistance	3	30	0	0
R1 b. Children's assistance	2	20	4	80
R1 c. Wife's assistance	4	40	0	0
R1 d. Wives' assistance	1	10	1	20
R1 e. Do it alone				
<b>Q2. Who does big household tasks?</b>				
R2 a. Working groups	5	50	3	60
R2 b. Working group and hired labour	1	10	0	0
R2 c. Husband and wife	1	10	0	0
R3 d. Wife's assistance	2	20	0	0
R3 e. Wife's and children's assistance	1	10	0	0

Appendix 7a. Cont'd.

R3 f. Neighbours' assistance	0	0	1	20
R3 g. Friends' and working group assistance	0	0	1	20
R3 h. Wife's working group	0	0	0	0
R3 i. Neighbours and friends	0	0	0	0
<b>Q3. Any assistance outside family members? 1</b>				
R3 a. Yes: from church group	1	10	0	0
R3 b. No: not outside family members	7	70	2	40
R3 c. No: only some little help from neighbours	1	10	0	0
R3 d. Yes: from working group	1	10	1	20
R3 e. Yes: from neighbours on request	0	0	0	0
R3 f. Yes: from working groups and friends	0	0	1	20
R3 g. Yes: some help is received	0	0	1	20
R3 h. Yes: from neighbours and friends	0	0	0	0
<b>Q4. Is any work done on other peoples' farms?</b>				
R4 a. Yes: in working group mutual arrangements	1	10	1	20
R4 b. Yes: for wage and mutual group arrangements	1	10	0	0
R4 c. Yes: on request and mutual group arrangements	0	0	1	20
R4 d. Yes: only on request	2	20	3	60
R4 e. No: not on other peoples' farms	3	30	0	0
R4 f. Missing response	1	10	0	0
R4 g. Yes: some work is done on other peoples' farms	1	10	0	0
R4 h. Yes: for wage on request	1	10	0	0
R4 i. Yes but for money	0	0	0	0
<b>Q5 Any affiliation to a communal self-help group?</b>				
R5 a. Yes: both self-help and church groups	1	10	0	0
R5 b. Yes: affiliated to a self-help group	7	70	4	80
R5 c. No: only my wife	1	10	0	0
R5 d. No: not affiliated to any communal group	1	10	1	20
<b>Q6 Ever hired labour?</b>				
R6 a. Yes: have hired labour	4	40	0	0
R6 b. No: have not hired labour	3	30	4	80
R6 c. Yes: have hired working group	2	20	1	20
R6 d. Yes: have hired working group and neighbours	1	10	0	0
<b>Q7 Ever worked for wages?</b>				
R7 a. Yes: have worked for wages	7	70	4	80
R7 b. No: have not worked for wages	2	20	1	10
R7 c. Yes: by use of own oxen plow facility	1	10	0	0

Appendix 7a. Cont'd.

**Q8 Getting enough help? Who would help if not?**

- R8 a. No: government can give loans
- R8 b. No: government/non-government bodies can help
- R8 c. No: not getting enough help
- R8 d. Yes: getting enough help
- R8 e. No government can help
- R8 f. No: non-governmental organizations can help
- R8 g. Yes: when there is adequate rainfall
- R8 h. No: any welfare body can assist
- R8 i. No: government or any willing helper

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**Q9 How does the farm compare with neighbours'?**

- R9 a. Better than neighbours'
- R9 b. Worse than neighbours'
- R9 c. Are the same
- R9 d. Missing response
- R9 e. Land good but poor managerially
- R9 f. Land better but poor managerially

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1  
0

10  
70  
10  
10  
0  
0

2  
3  
0  
0  
0  
0

40  
60  
0  
0  
0  
0

**Q10 Have any other source of income?**

- R10 a. Yes: from employed sons
- R10 b. No: trees for charcoal making are finished
- R10 c. No: there is no other source of income
- R10 d. Yes: a kiosk business

1  
1  
8  
0

10  
10  
80  
0

0  
0  
5  
0

0  
0  
100  
0

Appendix 8a. Chyulu men/women responses to "Shopping and Marketing Places", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Shopping and marketing	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Are the local kiosks used and on what criteria?</b>				
R1 a. Yes: chosen on stock adequacy basis	2	20	0	0
R1 b. Yes: at Kibarani chosen on proximity basis	1	10	0	0
R1 c. Yes: chosen on credit offer basis	3	30	1	20
R1 d. Yes: chosen on proximity basis	1	10	2	40
R1 e. Yes: chosen on proximity and credit basis	1	10	0	0
R1 f. Yes: chosen on stock adequacy and credit offer	1	10	1	20
R1 g. Yes: kiosks are used	1	10	0	0
R1 h. Yes: chosen on pre-shift acquaintance basis	0	0	1	20
R1 i. Yes: Kibarani and am not choosy	0	0	0	0
R1 j. No: Do buying at Kiundwani	0	0	0	0
<b>Q2. What are main market Centres near here?</b>				
R2 a. Mbui-nzau and Makindu townships	2	20	0	0
R2 b. Makindu township	8	80	5	100

Appendix 9a. Chyulu men/women responses to "Neighbour relationship", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Neighbour relationship	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Are Muuni people friendly/helpful/co-operative?</b>				
R1 a. Yes somehow they are	1	10	1	20
R1 b. Yes especially in working groups	1	10	0	0
R1 c. Yes they are	4	40	0	0
R1 d. Yes some are and some are not	1	10	2	40
R1 e. Yes only in time of need	1	10	1	20
R1 f. No they are not	2	20	1	20
R1 g. Yes: those originating from same place	0	0	0	0

Appendix 9a. Cont'd.

R1 g. Yes: those originating from Kalembwani	0	0	0	0	0
<b>Q2. Were the neighbours known before coming here?</b>					
R2 a. No they were not known	8	80	2	40	20
R2 b. Only two were known	0	0	1	20	40
R2 c. No: not all were known only some	2	20	2		
R2 d. No: not all, only those from Kalembwani					
<b>Q3. Are neighbours friendly/helpful/co-operative?</b>					
R3 a. Yes but not all	2	20	1	20	20
R3 b. Yes only in farm peak seasons	1	10	0	0	0
R3 c. Yes in time of dire need	1	10	2	40	40
R3 d. Yes on request	1	10	0	0	0
R3 e. Yes with arrangement	1	10	0	0	0
R3 f. Yes only those familiar to one another	0	0	1	20	20
R3 g. Yes they are	3	30	1	20	20
R3 h. Do not know	1	10	0	0	0
R3 i. No: not all, only those from Kalembwani	0	0	0	0	0
R3 j. No: not all only some	0	0	0	0	0
R3 k. No: not all especially the rich ones	0	0	0	0	0
<b>Q4. Do neighbours help in childcare/field/livestock?</b>					
R4 a. Yes: but on request	2	20	2	40	40
R4 b. Yes: they do	2	20	0	0	0
R4 c. Yes: they help in child care and farm work	0	0	1	20	20
R4 d. Yes: but with prior arrangement	5	50	2	40	40
R4 e. No: all work is done by husband and wife	1	10	0	0	0
R4 f. Yes: especially those from Kalembwani	0	0	0	0	0
<b>Q5. Do neighbours co-operate in time of crisis?</b>					
R5 a. Yes: this is automatic as soon as alarmed	0	0	1	20	20
R5 b. Yes: as soon as they are requested	10	100	4	80	80
<b>Q6. How often are mutual neighbourly visits made?</b>					
R6 a. Weekly or fortnightly	3	30	0	0	0
R6 b. Very rarely	0	0	1	20	20
R6 c. Only on Sundays	1	10	0	0	0
R6 d. Three times per week	1	10	0	0	0
R6 e. Once per month	1	10	0	0	0
R6 f. Once per fortnight	2	20	1	20	20
R6 g. Only on Sundays but not always	0	0	1	20	20
R6 h. Once per week	2	20	1	20	20

Appendix 9a. Cont'd.

R6 i. Once or twice per week	0	0	1	20
R6 j. Twice per week	0	0	0	0
R6 k. Once or twice per month	0	0	0	0
R6 l. Once per week or once per month	0	0	0	0
R6 m. Only by chance	0	0	0	0
<b>1</b>				
<b>Q7. What are main discussion topics during visits?</b>				
R7 a. Food and farm production matters	2	20	1	20
R7 b. School and education affairs	2	20	1	20
R7 c. Diseases and disease problems	1	10	0	0
R7 d. Climate and weather	1	10	0	0
R7 e. Future of children	1	10	0	0
R7 f. Neighbours	1	10	0	0
R7 g. Religion	1	10	0	0
R7 h. Tree diminishing	1	10	0	0
R7 i. Tree planting	1	10	0	0
R7 j. Water and water problem	5	50	2	40
R7 k. Future and village development	1	10	0	0
R7 l. Future of Muuni	5	50	1	20
R7 m. Solutions to Muuni problems	1	10	0	0
R7 n. Money problem	1	10	4	80
R7 o. Groups and group affairs	0	0	3	60
R7 p. Comparison of life with former settlements	0	0	0	0
R7 q. Soil nutrients and conservation	0	0	0	0
R7 r. Permanent houses	0	0	0	0
<b>Q8. How are neighbour relations pre- and post-shift?</b>				
R8 a. They were better in Chyulu than here in Muuni	8	80	4	80
R8 b. They are better here in Muuni than in Chyulu	1	10	0	0
R8 c. They are same in both areas-Chyulu and Muuni	1	10	1	20
R8 d. Better in Kalemwani than here in Muuni	0	0	0	0
R8 e. Better here in Muuni than in Kalemwani	0	0	0	0
R8 f. Same in both areas-Kalemwani and Muuni	0	0	0	0
<b>Q9. Ever had a dispute with the neighbour(s) here?</b>				
R9 a. No: not here but in Chyulu	1	10	0	0
R9 b. No: not at all	5	50	4	80
R9 c. Yes: have had a dispute	4	40	1	20
R9 d. No: because majority are Christians	0	0	0	0

Appendix 10a. Chyulu men/women responses to "Family relationship", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Family relationship	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Are there non-family residents in the household?</b>				
R1 a. No: there are none except own family	9	90	5	100
R1 b. Yes: there are	1	10	0	0
<b>Q2. Are there other relatives within Muuni scheme?</b>				
R2 a. Yes: there are	4	40	1	20
R2 b. No: there are not	6	60	4	80
<b>Q3. How are family relations pre- and post-shift?</b>				
R3 a. Were better in Chyulu Hills	2	20	1	20
R3 b. Are better here in Muuni	3	30	2	40
R3 c. Are the same in both areas	5	50	2	40

Appendix 11a. Chyulu men/women responses to "Village leadership", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Village leadership	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. How was/were your village elder(s) chosen?</b>				
R1 a. Ours was voted in by the villagers	2	20	3	60
R1 b. Ours was an Assistant Chief appointee	8	80	2	20
<b>Q2. What can be said about their leadership?</b>				
R2 a. Ours is a good leader and advisor	9	90	4	80
R2 b. Not all are good leaders	1	10	1	20
R2 c. Not all are good leaders but ours is good	0	0	0	0
R2 d. No comment to make	0	0	0	0

Appendix 12a. Chyulu men/women responses to "Religious affiliation", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Religious affiliation	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Affiliated to any religious group?</b>				
R1 a. Yes: Baptist Church	4	40	1	20
R1 b. No: am Animist	1	10	0	0
R1 c. Yes: Church Province of Kenya	1	10	1	20
R1 d. Yes: African Inland Church	1	10	1	20
R1 e. Yes: Catholic Church	3	30	2	40
R1 f. Yes: Salvation Army	0	0	0	0
R1 g. No: Only wife and children	0	0	0	0
R1 h. Yes: PEFA church	0	0	0	0
R1 i. Yes: Redeemed church	0	0	0	0
<b>Q2. Knew Church members before coming here?</b>				
R2 a. No: I recruited them	1	10	0	0
R2 b. No: not applicable in my case	1	10	0	0
R2 c. No: not at all	5	50	3	60
R2 d. Yes: known to me before coming here	1	10	0	0
R2 e. Yes: some of them	2	20	2	40
R2 f. Yes: those from Kalemhwani	0	0	0	0
<b>Q3. What other Church functions beside worship?</b>				
R3 a. Mainly assist sick ones	4	40	4	80
R3 b. Not applicable in my case	1	10	0	0
R3 c. Assist in sick cases and other urgent matter	4	40	1	20
R3 d. Assist needy members	1	10	0	0
R3 e. Assist sickness cases and farm work	0	0	0	0
R3 f. Assist in any trouble times	0	0	0	0
R3 g. Raise money for the sick members	0	0	0	0
<b>Q4. Would the Church help during crisis?</b>				
R4 a. Yes: it would	9	90	5	100
R4 b. No: not applicable in my case	1	10	0	0



Appendix 13a. Chyulu men/women responses to "Communal group affiliation", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Communal group affiliation	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Belong to any men/women group?</b>				
R1 a. Yes: belong to a men/women group	2	20	0	0
R1 b. Yes: belong to a women group	2	20	4	80
R1 c. Yes: belong to a group	3	30	1	20
R1 d. No: only my wife	2	20	0	0
R1 e. Yes: used to be but the group is now dead	1	10	0	0
<b>Q2. How was the group formed?</b>				
R2 a. It was one woman's idea	2	20	0	0
R2 b. 1996/with 16 members	0	0	1	20
R2 c. 1996/with 15 members	1	10	0	0
R2 d. Was women's idea	1	10	1	20
R2 e. Was men and women idea	1	10	0	0
R2 f. Was Village elder's idea	1	10	0	0
R2 g. When visiting and help a sick person	1	10	1	20
R2 h. I myself formed it	1	10	0	0
R2 i. Not applicable in my case	2	20	0	0
R2 j. 1995/with 30 members during sick case visit	0	0	1	20
R2 k. 1996/with 17 members-visit to a fallen faithful	0	0	1	20
R2 l. With 40 members-search for ground well water	0	0	0	0
R2 m. Missing response	0	0	0	0
R2 n. 1996/with 25 members during sick case visiting	0	0	0	0
R2 o. 1996/with 25 members	0	0	0	0
R2 p. 1996 while visiting a sick case	0	0	0	0
R2 q. 1996/with 40 members/was village elders idea	0	0	0	0
R2 r. 1996/with 40 members/search for ground Well	0	0	0	0
R2 s. 1997/with 18 members	0	0	0	0
R2 t. 1995/with 25 members/formed by church members	0	0	0	0
R2 u. 1996/with 23 members	0	0	0	0
R2 v. 1995/with 23 members/when a farmer had big task	0	0	0	0
R2 w. 1996/with 28 members/was Chief's idea	0	0	0	0
<b>Q3. Who else belongs to the group?</b>				
R3 a. Just local village members	7	70	4	80
R3 b. Local village members and my wife	1	10	0	0
R3 c. Not applicable in my case	2	20	0	0
R3 d. Other local church members	0	0	1	20

Appendix 13a. Cont'd.

R3 e. My son and local members	0	0	0	0
R3 f. Local members and village elder	0	0	0	0
R3 g. Missing response	0	0	0	0
<b>Q4. What does the group do?</b>				
R4 a. Farm work and funds raising	1	10	2	40
R4 b. Farm work	3	30	1	20
R4 c. Every kind of work	1	10	0	0
R4 d. Farm and construction work	1	10	0	0
R4 e. Farm big tasks	1	10	1	20
R4 f. Bee keeping	1	10	0	0
R4 g. Not applicable in my case	2	20	0	0
R4 h. Preaching work	0	0	1	20
R4 i. Dig well but work now dormant	0	0	0	0
R4 j. Senior member take-easy-tasks	0	0	0	0
R4 k. Funds raising and banking	0	0	0	0
R4 l. Keeps honey bees	0	0	0	0
<b>Q5. Belonging or know any other group in Muuni?</b>				
R5 a. Yes: belong to a church group	1	10	0	0
R5 b. Yes: aware of others but not a member	1	10	0	0
R5 c. Yes: belong to other(s)	5	50	3	60
R5 d. No: do not belong to any	1	10	1	20
R5 e. No: not applicable in my case	1	10	0	0
R5 f. Missing response	1	10	1	20
<b>Q6. Meet members of Parent/Teacher Association (PTA)?</b>				
R6 a. Yes: every Tuesday for school work	7	70	2	40
R6 b. Yes: Tuesdays/Fridays for school work	1	10	2	40
R6 c. Yes: every Friday for school work	1	10	0	0
R6 d. No: do not meet them	1	10	0	0
R6 e. Missing response	0	0	1	20
R6 f. No: only my son every Tuesday for school work	0	0	0	0

Appendix 14a. Chyulu men/women responses to "External organizations assistance", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: External aid/assistance	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Ever received external help/advice/assistance?</b>				
R1 a. Yes: from GOK, AMREF, GOI, Redeemed/Catholics	1	10	0	0
R1 b. Yes: from AMREF	6	60	4	80
R1 c. Yes: from GOK and AMREF	2	20	1	20
R1 d. Yes: in form of church group work	1	10	0	0
<b>Q2. Did the aid help?</b>				
R2 a. Yes: especially from AMREF/Government of India	1	10	0	0
R2 b. Yes: it did help	6	60	4	80
R2 c. Yes: especially from AMREF	2	20	1	20
R2 d. No: not applicable in my case	1	10	0	0
<b>Q3. What help would be needed now?</b>				
R3 a. Oxen/Plow, water and loan	2	20	1	20
R3 b. Oxen/Plow and water	1	10	0	0
R3 c. Oxen/Plow and loan	1	10	0	0
R3 d. Oxen/Plow, water and land title deed	1	10	1	20
R3 e. Oxen/Plow, permanent house and water	1	10	1	20
R3 f. Water, loan and more land	1	10	0	0
R3 g. More land, tractor service and water	1	10	0	0
R3 h. Money, water and land title deed	1	10	0	0
R3 i. More land, water and land title deed	1	10	0	0
R3 j. Water, land title deed, loan and oxen/plow	0	0	1	20
R3 k. Water, oxen/plow and money	0	0	1	20
R3 l. School fees/books and oxen plow	0	0	0	0

Appendix 15a. Chyulu men/women responses to "Life and future of Muuni settlement scheme", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Life/future of Muuni	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Is life in Muuni good or bad now?</b>				
R1 a. It is bad	1	10	0	0
R1 b. Would be good if there was water	6	60	3	60
R1 c. It is bad but .....	2	20	1	20
R1 d. It is bad because of Malaria	1	10	0	0
R1 e. Would be good if there was water and hospital	0	0	1	20
<b>Q2. Is Muuni future expected to improve or get worse?</b>				
R2 a. Get worse	4	40	0	0
R2 b. Improve	0	0	1	20
R2 c. Improve if water is available	4	40	3	60
R2 d. Improve if there is water and hospitals	1	10	1	20
R2 e. Improve if there is water and social amenities	1	10	0	0
<b>Q3. What are expected changes by next year?</b>				
R3 a. Water/food/health/business situation to improve	1	10	0	0
R3 b. Water and food situation to improve	2	20	0	0
R3 c. Water situation to improve	0	0	1	20
R3 d. Food situation to improve	1	10	0	0
R3 e. Situation is unknown	1	10	0	0
R3 f. Kiosks and shops to increase	1	10	0	0
R3 g. Better changes if rain continues like this year	2	20	2	40
R3 h. Increased group cooperation	0	0	1	20
R3 i. Improved overall Muuni conditions	0	0	1	20
R3 j. Missing response	2	20	0	0
R3 k. Kiosks to increase	0	0	0	0
R3 l. Business to increase	0	0	0	0
R3 m. Better if rain continues and piped water develop	0	0	0	0
R3 n. Future is unknown	0	0	0	0

Appendix 15a. Cont'd.

**Q4. What are expected changes in five years time?**

- R4 a. With aid ↑schools/water/hospitals & vice versa
- R4 b. Treeless area in absence of water
- R4 c. Treeless and desert-like
- R4 d. Future unknown
- R4 e. Better place if rain continues like this year
- R4 f. Desert-like
- R4 g. Missing response
- R4 h. Only God knows the future

**Q5. What is most hoped for achievement next year?**

- R5 a. Develop business/commercial plot/green veg kiosk
- R5 b. Build a better house
- R5 c. Make/bake bricks for a better house
- R5 d. Increase livestock
- R5 e. Build a kiosk
- R5 f. Start a kiosk business
- R5 g. None hoped for
- R5 h. Build a kiosk and start business
- R5 i. Start a business
- R5 j. Start a business and conserve soil on the farm
- R5 k. Build a better house and buy a commercial plot
- R5 l. Be able to buy a milk cow
- R5 m. Start livestock trade involving goats
- R5 n. Future is unknown
- R5 o. Start second-hand clothes business
- R5 p. Start maize sale business

**Q6. What is most hoped for achievement in five years**

- R6 a. Ox/plow, develop business/plot, acquire new plot
- R6 b. None hoped for
- R6 c. Build permanent house
- R6 d. Build permanent house and increase farm area
- R6 e. Future is unknown
- R6 f. Buy and increase land
- R6 g. Missing response
- R6 h. Too old to rely on future
- R6 i. No hope unless rich/non-governmental bodies help
- R6 j. Only God knows the future

1	10	0	0	0
1	10	0	0	0
0	0	1	0	20
2	20	3	0	60
2	20	0	0	0
3	30	1	0	20
1	10	0	0	0
0	0	0	0	0
1	10	0	0	0
2	20	0	0	0
0	0	1	0	20
1	10	0	0	0
1	10	0	0	0
1	10	3	0	60
1	10	0	0	0
0	0	1	0	20
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	10	0	0	0
3	30	1	0	20
1	10	0	0	0
2	20	3	0	60
1	10	1	0	20
1	10	0	0	0
0	0	0	0	0
0	0	0	0	0

ANTHROPOLOGICAL RESPONSES FROM SINGLE SUBJECT INTERVIEWEES  
ORIGINATING FROM KALEMBWANI, MUUNI SETTLEMENT SCHEME, 1998

Appendix 1b. Kalemwani men/women responses to "Situation before coming to Muuni", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Situation prior to Muuni residence	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. How was family situation prior to relocation?</b>				
R1 a. Happy and health due to ↑food ↓ diseases	9	90	5	100
R1 b. Somehow was happy and health	0	0	0	0
R1 c. Was the same as here	0	0	0	0
R1 d. Had two happy wives and children	1	10	0	0
<b>Q2. How was livestock situation prior to relocation?</b>				
R2 a. Healthy 7 cows-40 goats-9 sheep	0	0	0	0
R2 b. Healthy 5 goats	0	0	0	0
R2 c. Healthy 12 goats	0	0	0	0
R2 d. Healthy 4 goats-7 sheep-2 ass	0	0	0	0
R2 e. Had no livestock	0	0	0	0
R2 f. Unhealthy 38 cows-30 goats-15 sheep	0	0	0	0
R2 g. Healthy 5 cows-140 goats-17 sheep	0	0	0	0
R2 h. Healthy 6 cows-24 goats	0	0	0	0
R2 i. Healthy 34 goats	0	0	0	0
R2 j. Healthy 17 goats	0	0	0	0
R2 k. Healthy 25 goats	0	0	0	0
R2 l. Healthy 2 cows-10 goats-2 sheep	0	0	0	0
R2 m. Healthy unnumbered goats	0	0	0	0
R2 n. 10 goats	0	0	0	0
R2 o. 18 goats	1	10	0	0
R2 p. Healthy 1 cow-18 goats	1	10	0	0
R2 q. Healthy 5 cows-21 goats	1	10	0	0
R2 r. Healthy 30 cows-40 goats-25 sheep	1	10	0	0
R2 s. Healthy 3 cows-14 goats	1	10	0	0
R2 t. Healthy 15 cows-14 goats	1	10	0	0
R2 u. Considerable healthy 22 cows-40 goats-12 sheep	1	10	0	0
R2 v. Healthy 2 cows-12 goats	0	0	1	20

Appendix 1b. Cont'd.

R2 w. Healthy 7 cows-5 goats-10 sheep	1	10	0	0
R2 x. Healthy 20 goats	1	10	0	0
R2 x. Healthy cows and goats	1	10	1	20
R2 y. Healthy 5 cows-20 goats- 3 sheep	0	0	1	20
R2 z. Had 30 cows-40 goats-20 sheep	0	0	1	20
R2 aa. Healthy 10 cows-15 goats	0	0	0	20
R2 ab. Healthy 5 cows-20 goats	1	10	0	0
<b>Q3. How were neighbours relations?</b>				
R3 a. Relations were very good	9	90	5	100
R3 b. Relations were good	0	0	0	0
R3 c. Missing response	0	0	0	0
R3 d. Relation very good- thus fight Maasai raiders	1	10	0	0

Appendix 2b. Kalemchwani men/women responses to "period of residence in pre-shift settlement areas", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Period of residence in Kalemchwani	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. How long was the residence in Kalemchwani ?</b>				
R1. Early 1930s to early 1990s	2	20	0	0
R2. Mid-1930s to early 1990s	0	0	0	0
R3. Late 1930s to early 1990s	1	10	1	20
R4. Early 1950s to early 1990s	4	40	1	20
R5. Mid-1950s to early 1990s	0	0	0	0
R6. Late 1950s to early 1990s	2	20	0	0
R7. Early 1960s to early 1990s	1	10	1	20
R8. Mid-1960s to early 1990s	0	0	0	0
R9. Late 1960s to early 1990s	0	0	1	20
R10. Early 1970s to early 1990s	0	0	0	0
R11. Mid-1970s to early 1990s	0	0	0	0
R12. Late 1970s to early 1990s	0	0	1	20
R13. Early 1980s to early 1990s	0	0	0	0
R14. 1981 to 1988	0	0	0	0
R15. 1990 to 1992	0	0	0	0

Appendix 3b. Kalemwani men/women responses to "Ancestral dwellings before Kalemwani", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: The ancestral dwellings before Kalemwani	No. of men responding (n=10)	%	No. of women responding (n=5)	%
Q1. Where were the dwellings prior to Kalemwani ?				
R1. Mid-Machakos zone	0	0	0	0
R2. From elsewhere	0	0	0	0
R3. Mid-Machakos zone (Mukaa area)	9	90	4	80
R4. Mid-Machakos zone (Kitaingo area)	1	10	0	0
R5. Mid-Machakos zone (Kwa-Kivingo area)	0	0	1	20

Appendix 4b. Kalemwani men/women responses to "Becoming aware of the Shift from Kalemwani", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Becoming aware of the Shift	No. of men responding (n=10)	%	No. of women responding (n=5)	%
Q1. When or how was the shift awareness alerted?				
R1 a. Becoming aware in 1992	0	0	0	0
R1 b. Informed by chief in 1992	0	0	0	0
R1 c. Informed by Kenya Wildlife Service (KWS) personnel	0	0	0	0
R1 d. Informed by Chief	0	0	0	0
R1 e. Informed by District Commissioner (D.C) through Chief	0	0	0	0
R1 f. Informed by Administrative Police (AP)	0	0	0	0
R1 g. Informed by Chief and KWS personnel	0	0	0	0
R1 h. Informed by Assistant Chief through Village Elder	0	0	0	0
R1 i. Informed by Chief in 1985	0	0	0	0
R1 j. Informed by Assistant Chief	0	0	0	0
R1 k. When houses were torched	0	0	0	0
R1 l. Informed by a visiting District Officer.	0	0	0	0
R1 m. Missing response	0	0	0	0
R1 n. Informed by D.C Kajjado District	1	10	0	0
R1 o. Informed by D.Cs. Machakos/Kajjado Districts	1	10	0	0
R1 p. Informed by D.O.	7	70	4	80





Appendix 4b. Cont'd.

<b>Q5. Did all family members shift together at once?</b>				
R5 a. All family members moved together at once	5	50	3	60
R5 b. House head moved first to prepare for the family	0	0	0	0
R5 c. First moved with some then went for the rest later	0	0	0	0
R5 d. All family members at once except some children	0	0	0	0
R5 e. All 3-month at Mbui-nzau	1	10	0	0
R5 f. All but stayed at Kiundwani first	2	20	0	0
R5 g. No: had hired room at Kima for them first	1	10	0	0
R5 h. All but had moved livestock first	1	10	0	0
R5 i. Missing response	0	0	2	40
<b>Q6. Were there lost or left behind personal property?</b>				
R6 a. Some property lost in transit/stolen or left behind	9	90	5	100
R6 b. No loss except some broken household items	1	10	0	0

Appendix 5b. Kalemwani men/women responses to "New land acquisition process", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Inquiry: New Land Acquisition</b>				
<b>Q1. What process was used in acquiring new land at Muuni?</b>				
R1. By ballot papers at Kibwezi D.Os. Office	0	0	0	0
R2. By ballot papers at Metava Shopping Centre	0	0	0	0
R3. By ballot papers	8	80	5	100
R4. By ballot Kalemwani	2	20	0	0

Appendix 6b. Kalemchwani men/women responses to "Land use plan" Muuni Settlement Scheme, Makeni District, Kenya, 1998.

Inquiry: Land use plan at Muuni	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Any change of land use plan on arrival at Muuni?</b>				
R1 a. Formation of working groups to open new farms	0	0	0	0
R1 b. Build house, clear bush and increase livestock	0	0	0	0
R1 c. Did not change any plan	2	40	1	20
R1 d. Embarked on bush clearing as first priority	0	0	0	0
R1 e. Made use of oxen plow unlike in Kalemchwani	0	0	0	0
R1 f. Started working for wage earning	0	0	0	0
R1 g. Started strip cropping for the first time	0	0	0	0
R1 h. Sold livestock to clear bush and build house	0	0	0	0
R1 i. Missing response	0	0	0	0
R1 j. Started making charcoal for sale	1	10	0	0
R1 k. Practiced dryland farming	1	10	0	0
R1 l. Could plan/manage owned land my own way	3	30	0	0
R1 m. Established friendship with new neighbours	1	10	0	0
R1 n. Embarked on a determined hard work	0	0	1	20
R1 o. Planned to open up land and find water	1	10	0	0
R1 p. Could plan/manage/work hard on owned land	0	0	2	40
R1 q. Could plan/manage/care for owned land	0	0	1	20
R1 r. Could hire tractor and improve soil	1	10	0	0
<b>Q2. Was any portion of land sold or bought?</b>				
R2 a. Six (6) acres were sold	0	0	0	0
R2 b. Four (4) acres were sold	0	0	0	0
R2 c. Three (3) acres were sold	2	20	0	0
R2 d. One (1) acre was sold	1	10	1	20
R2 e. No portion of land was sold or bought	6	60	4	80
R2 f. Two (2) more acres were bought in addition	0	0	0	0
R2 g. Missing response	0	0	0	0
R2 h. Five (5) acres were sold	1	10	0	0
<b>Q3. Pleased with own farm achievement so far?</b>				
R3 a. No: not pleased with my achievement so far	6	60	3	60
R3 b. Yes: only this year because of good harvest	4	40	1	20
R3 c. Yes: pleased but water is still a problem	0	0	0	0
R3 d. Yes: because of good harvest/green vegetables	0	0	0	0
R3 e. Yes: pleased with my achievement	0	0	0	0
R3 b. Yes: because of good harvest/plenty for sale	0	0	1	20

Appendix 6b. Cont'd.

<b>Q4. What Changes would be made or suggested?</b>					
R4 a. Water development in the area	1	10	0	0	0
R4 b. Availability of Tractor farming service	0	0	0	0	0
R4 c. Soil conservation and water development	0	0	0	0	0
R4 d. Use of oxen plow in land preparation	0	0	0	0	0
R4 e. Buy more land	1	10	0	0	0
R4 f. Increase farming area and conserve soil	0	0	4	0	80
R4 g. Develop water, build good house/use oxen plow	1	10	1	0	20
R4 h. Use of oxen plow and water development	1	10	0	0	0
R4 i. Water development and build good house	1	10	0	0	0
R4 j. Water development and good business	1	10	0	0	0
R4 k. Water/oxen plow and employ farm hand	1	10	0	0	0
R4 l. Provide tractor service and develop water	1	10	0	0	0
R4 m. Conserve soil/develop water/build good house	1	10	0	0	0
R4 n. Develop water/increase land/provide oxen plow	1	10	0	0	0
R4 o. Provide water and increase land	1	10	0	0	0
R4 p. Conserve soil					
<b>Q5. What are the immediate plans?</b>					
R5 a. Harvesting, land preparation and planting	0	0	0	0	0
R5 b. Harvesting and opening more land for farming	0	0	0	0	0
R5 c. Harvesting and planting	0	0	0	0	0
R5 d. Planting	0	0	0	0	0
R5 e. Start a kiosk business	0	0	0	0	0
R5 f. Planting and selling food to start business	0	0	0	0	0
R5 g. Harvesting and Land preparation	0	0	0	0	0
R5 h. Harvesting	0	0	0	0	0
R5 i. Land preparation by removal of crop residue	6	60	0	0	20
R5 j. Land preparation	0	0	1	0	0
R5 k. Build new house	1	10	0	0	0
R5 l. Build kiosk at Klundwani	1	10	0	0	0
R5 m. Land preparation/crop residue removal/planting	2	20	4	0	80
<b>Q6. Any learned new skilled labour?</b>					
R6 a. No: none except what I already know	7	70	5	100	
R6 b. Yes: about planting methods	0	0	0	0	
R6 c. Yes: from AMREF	0	0	0	0	
R6 d. Yes: adoption of dry land life/farming methods	0	0	0	0	
R6 e. Yes: from AMREF and MoA extension service	0	0	0	0	
R6 f. Yes: adoption of dry land life/planting method	3	30	0	0	

Appendix 7b. Kalemwani men/women responses to "Description of work Activities", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Description of work activities	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Who does daily household tasks?</b>				
R1 a. Wife's and children's assistance	7	70	0	0
R1 b. Children's assistance	0	0	5	100
R1 c. Wife's assistance	3	30	0	0
R1 d. Wives' assistance	0	0	0	0
R1 e. Do it alone				
<b>Q2. Who does big household tasks?</b>				
R2 a. Working groups	2	20	3	60
R2 b. Working group and hired labour	0	0	0	0
R2 c. Husband and wife	0	0	0	0
R2 d. Wife's assistance	1	10	0	0
R2 e. Wife's and children's assistance	0	0	0	0
R2 f. Neighbours' assistance	1	10	0	0
R2 g. Friends' and working group assistance	0	0	1	20
R2 h. Wife's working group	1	10	0	0
R2 i. Friends' assistance	4	40	1	20
R2 j. Neighbours and friends	1	10	0	0
<b>Q3. Any assistance outside family members?</b>				
R3 a. Yes: from church group	0	0	0	0
R3 b. No: not outside family members	8	80	1	20
R3 c. No: only some little help from neighbours	0	0	0	0
R3 d. Yes: from working group	0	0	3	60
R3 e. Yes: from neighbours on request	0	0	0	0
R3 f. Yes: from working groups and friends	0	0	0	0
R3 g. Yes: some help is received	0	0	0	0
R3 h. Yes: from neighbours and friends	1	10	1	20
R3 i. Yes: from friends	1	10	0	0

Appendix 7b. Cont'd.

<b>Q4. Is any work done on other peoples' farms?</b>					
R4 a. Yes: in working group mutual arrangements	0	0	0	0	0
R4 b. Yes: for wage and mutual group arrangements	0	0	0	0	0
R4 c. Yes: on request and mutual group arrangements	0	0	0	0	0
R4 d. Yes: only on request	5	50	1	50	20
R4 e. No: not on other peoples' farms	5	50	1	50	20
R4 f. Missing response	0	0	0	0	0
R4 g. Yes: some work is done on other peoples' farms	0	0	0	0	0
R4 h. Yes: for wage on request	0	0	1	0	20
R4 i. Yes but for money	0	0	1	0	20
R4 j. Missing response	0	0	1	0	20
<b>Q5. Any affiliation to a communal self-help group?</b>					
R5 a. Yes: both self-help and church groups	0	0	0	0	0
R5 b. Yes: affiliated to a self-help group	4	40	5	40	100
R5 c. No: only my wife	2	20	0	20	0
R5 d. No: not affiliated to any communal group	4	40	0	40	0
<b>Q6. Ever hired labour?</b>					
R6 a. Yes: have hired labour	3	30	1	30	20
R6 b. No: have not hired labour	6	60	3	60	60
R6 c. Yes: have hired working group	1	10	1	10	20
R6 d. Yes: have hired working group and neighbours	0	0	0	0	0
<b>Q7. Ever worked for wages?</b>					
R7 a. Yes: have worked for wages	7	70	3	70	60
R7 b. No: have not worked for wages	3	30	2	30	20
R7 c. Yes: by use of own oxen plow facility	0	0	0	0	0
<b>Q8. Getting enough help? Who would help if not?</b>					
R8 a. No: government can give loans	0	0	0	0	0
R8 b. No: government/non-government bodies can help	8	80	4	80	80
R8 c. No: not getting enough help	0	0	0	0	0
R8 d. Yes: getting enough help	0	0	0	0	0
R8 e. No: government can help	0	0	0	0	0
R8 f. No: non-governmental organizations can help	1	10	0	10	0
R8 g. Yes: when there is adequate rainfall	0	0	0	0	0
R8 h. No: any welfare body can assist	1	10	1	10	20
R8 i. No: government or any willing helper	0	0	0	0	0

Appendix 7b. Cont'd.

<b>Q9. How does the farm compare with neighbours'?</b>				
R9 a. Better than neighbours'	0	0	0	0
R9 b. Worse than neighbours'	5	50	5	100
R9 c. Are the same	0	0	0	0
R9 d. Missing response	1	10	0	0
R9 e. Land good but poor managerially	3	30	0	0
R9 f. Land better but poor managerially	1	10	0	0
R9 g. better than neighbours-I have oxen plow				
<b>Q10. Have any other source of income?</b>				
R10 a. Yes: from employed sons	0	0	0	0
R10 b. No: trees for charcoal making are finished	0	0	0	0
R10 c. No: there is no other source of income	9	90	5	100
R10 d. Yes: a kiosk business	1	10	0	0

Appendix 8b. Kalemwani men/women responses to "Shopping and Marketing Places", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

<b>Inquiry: Shopping and marketing</b>	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Are the local kiosks used and on what criteria?</b>				
R1 a. Yes: chosen on stock adequacy basis	1	10	0	0
R1 b. Yes: at Kibarani chosen on proximity basis	0	0	1	20
R1 c. Yes: chosen on credit offer basis	1	10	0	0
R1 d. Yes: chosen on proximity basis	4	40	3	60
R1 e. Yes: chosen on proximity and credit basis	1	10	0	0
R1 f. Yes: chosen on stock adequacy and credit offer	0	0	0	0
R1 g. Yes: kiosks are used	0	0	1	20
R1 h. Yes: chosen on pre-shift acquaintance basis	0	0	0	0
R1 i. Yes: Kibarani and am not choosy	1	10	0	0
R1 j. No: Do buying at Kiundwani shopping centre	2	20	0	0
<b>Q2. What are main market Centres near here?</b>				
R2 a. Mbui-nzau and Makindu townships	0	0	0	0
R2 b. Makindu township	10	100	5	100

Appendix 9b. Kalemchwani men/women responses to "Neighbour relationship", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Neighbour relationship	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Are Muuni people friendly/helpful/co-operative?</b>				
R1 a. Yes somehow they are	6	60	0	0
R1 b. Yes especially in working groups	0	0	0	0
R1 c. Yes they are	2	20	1	20
R1 d. Yes some are and some are not	0	0	0	0
R1 e. Yes only in time of need	0	0	0	0
R1 f. No they are not	0	0	0	0
R1 g. Yes: those originating from same place	2	20	3	60
R1 g. Yes: those originating from Kalemchwani	0	0	1	20
<b>Q2. Were the neighbours known before coming here?</b>				
R2 a. No: they were not known	1	10	0	0
R2 b. Only two were known	0	0	0	0
R2 c. No: not all were known only some	2	20	0	0
R2 d. No: not all, only those from Kalemchwani	7	70	5	100
<b>Q3. Are neighbours friendly/helpful/co-operative?</b>				
R3 a. Yes but not all	0	0	0	0
R3 b. Yes only in farm peak seasons	0	0	0	0
R3 c. Yes in time of dire need	0	0	0	0
R3 d. Yes on request	0	0	0	0
R3 e. Yes with arrangement	0	0	0	0
R3 f. Yes only those familiar to one another	0	0	0	0
R3 g. Yes they are	2	20	1	20
R3 h. Do not know	0	0	0	0
R3 i. No: not all, only those from Kalemchwani	4	40	3	60
R3 j. No: not all only some	4	40	0	0
R3 k. No: not all especially the rich ones	0	0	1	20
<b>Q4. Do neighbours help in childcare/field/livestock?</b>				
R4 a. Yes: but on request	0	0	0	0
R4 b. Yes: they do	9	90	5	100
R4 c. Yes: they help in child care and farm work	0	0	0	0
R4 d. Yes: but with prior arrangement	0	0	0	0
R4 e. No: all work is done by husband and wife	0	0	0	0
R4 f. Yes: especially those from Kalemchwani	1	10	0	0



Appendix 9b. Cont'd.

**Q5. Do neighbours co-operate in time of crisis?**

R5 a. Yes: this is automatic as soon as alarmed  
 R5 b. Yes: as soon as they are requested

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**Q6. How often are mutual neighbourly visits made?**

R6 a. Weekly or fortnightly  
 R6 b. Very rarely  
 R6 c. Only on Sundays  
 R6 d. Three times per week  
 R6 e. Once per month  
 R6 f. Once per fortnight  
 R6 g. Only on Sundays but not always  
 R6 h. Once per week  
 R6 i. Once or twice per week  
 R6 j. Twice per week  
 R6 k. Once or twice per month  
 R6 l. Once per week or once per month  
 R6 m. Only by chance

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**Q7. What are main discussion topics during visits?**

R7 a. Food and farm production matters  
 R7 b. School and education affairs  
 R7 c. Diseases and disease problems  
 R7 d. Climate and weather  
 R7 e. Future of children  
 R7 f. Neighbours  
 R7 g. Religion  
 R7 h. Tree diminishing  
 R7 i. Tree planting  
 R7 j. Water and water problem  
 R7 k. Future and village development  
 R7 l. Future of Muuni  
 R7 m. Solutions to Muuni problems  
 R7 n. Money problem  
 R7 o. Groups and group affairs  
 R7 p. Comparison of life with former settlements  
 R7 q. Soil nutrients and conservation  
 R7 r. Permanent houses

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Appendix 9b. Cont'd.

Q8. How are neighbour relations pre- and post-shift?				
R8 a. Better in Kalemhwani than here in Muuni	8		80	3
R8 b. Better here in Muuni than in Kalemhwani	2		20	2
R8 c. Same in both areas-Kalemhwani and Muuni	0		0	0
R8 d. Better in Kalemhwani than here in Muuni	0		0	0
R8 e. Better here in Muuni than in Kalemhwani	0		0	0
R8 f. Same in both areas-Kalemhwani and Muuni	0		0	0
Q9. Ever had a dispute with the neighbour(s) here?				
R9 a. No: not here but in Muuni	0		0	0
R9 b. No: not at all	5		50	5
R9 c. Yes: have had a dispute	4		40	0
R9 d. No: because majority are Christians	1		10	0

Appendix 10b. Kalemhwani men/women responses to "Family relationship", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Family relationship	No. of men responding (n=10)	%	No. of women responding (n=5)	%
Q1. Are there non-family residents in the household?				
R1 a. No: there are none except own family	10	100	5	100
R1 b. Yes: there are	0	0	0	0
Q2. Are there other relatives within Muuni scheme?				
R2 a. Yes: there are	3	30	1	20
R2 b. No: there are not	7	70	4	80
Q3. How are family relations pre- and post-shift?				
R3 a. Were better in Kalemhwani	0	0	1	20
R3 b. Are better here in Muuni	1	10	1	20
R3 c. Are the same in both areas	9	90	3	60

Appendix 11b. Kalemwani men/women responses to "Village leadership", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Village leadership	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. How was/were your village elder(s) chosen?</b>				
R1 a. Ours was voted in by the villagers	0	0	0	0
R1 b. Ours was an Assistant Chief appointee	10	100	5	100
<b>Q2. What can be said about their leadership?</b>				
R2 a. Ours is a good leader and advisor	5	50	1	20
R2 b. Not all are good leaders	2	20	3	60
R2 c. Not all are good leaders but ours is good	2	20	0	0
R2 d. No comment to make	0	0	1	20
R2 e. Some are bad leaders for they accept graft	1	10	0	0

Appendix 12b. Kalemwani men/women responses to "Religious affiliation", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Religious affiliation	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Affiliated to any religious group?</b>				
R1 a. Yes: Baptist Church	0	0	0	0
R1 b. No: am Animist	3	30	1	20
R1 c. Yes: Church Province of Kenya	1	10	1	20
R1 d. Yes: African Inland Church	0	0	0	0
R1 e. Yes: Catholic Church	3	30	0	0
R1 f. Yes: Salvation Army	1	10	0	0
R1 g. No: Only wife and children	1	10	0	0
R1 h. Yes: PEFA church	0	0	1	20
R1 i. Yes: Redeemed church	1	10	2	40

Appendix 12b. Cont'd.

<b>Q2. Knew Church members before coming here?</b>				
R2 a. No: I recruited them	0	0	0	0
R2 b. No: not applicable in my case	4	40	0	0
R2 c. No: not at all	0	0	1	20
R2 d. Yes: known to me before coming here	0	0	0	0
R2 e. Yes: some of them	1	10	0	0
R2 f. Yes: those from Kalemchwani	5	50	4	40
<b>Q3. What other Church functions beside worship?</b>				
R3 a. Mainly assist sick ones	2	20	2	40
R3 b. Not applicable in my case	4	40	1	20
R3 c. Assist in sick cases and other urgent matter	0	0	0	0
R3 d. Assist needy members	0	0	0	0
R3 e. Assist sickness cases and farm work	2	20	2	40
R3 f. Assist in any trouble times	1	10	0	0
R3 g. Raise hospital money for the sick members	1	10	0	0
<b>Q4. Would the Church help during crisis?</b>				
R4 a. Yes: it would	6	60	4	80
R4 b. No: not applicable in my case	4	10	1	20

13b. Kalemchwani men/women responses to "Communal group affiliation", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Communal group affiliation	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Belong to any men/women group?</b>				
R1 a. Yes: belong to a men/women group	0	0	0	0
R1 b. Yes: belong to a women group	0	0	0	0
R1 c. Yes: belong to a group	6	60	5	100
R1 d. No: only my wife	4	40	0	0
R1 e. Yes: used to be but the group is now dead	0	0	0	0
<b>Q2. How was the group formed?</b>				
R2 a. It was one woman's idea	0	0	0	0
R2 b. 1996/with 16 members	0	0	0	0

Appendix 13b. Cont'd.

R2 c. 1996/with 15 members	0	0	0	0
R2 d. Was women's idea	0	0	0	0
R2 e. Was men and women idea	0	0	0	0
R2 f. Was Village elder's idea	0	0	0	0
R2 g. When visiting and help a sick person	0	0	0	0
R2 h. I myself formed it	30	0	0	0
R2 i. Not applicable in my case	0	0	0	0
R2 j. 1995/with 30 members during sick case visit	0	0	0	0
R2 k. 1996/with 17 members-visit to a fallen faithful	10	0	0	0
R2 l. With 40 members-search for ground well water	10	0	0	0
R2 l. With 40 members-search for ground well water	10	0	0	0
R2 m. Missing response	0	1	0	20
R2 n. 1996/with 25 members during sick case visiting	0	0	0	0
R2 o. 1996/with 25 members	10	0	0	0
R2 p. 1996 while visiting a sick case	10	0	0	0
R2 q. 1996/with 40 members/was village elders idea	0	1	0	20
R2 r. 1996/with 40 members/search for ground Well	0	1	0	20
R2 s. 1997/with 18 members	0	0	0	0
R2 t. 1995/with 25 members/formed by church members	10	0	0	20
R2 u. 1996/with 23 members	0	1	0	20
R2 v. 1995/with 23 members/when a farmer had big task	0	1	0	20
R2 w. 1996/with 28 members/was Chief's idea	10	0	0	0
<b>Q3. Who else belongs to the group?</b>				
R3 a. Just local village members	1	10	3	60
R3 b. Local village members and my wife	3	30	0	0
R3 c. Not applicable in my case	2	20	0	0
R3 d. Other local church members	0	0	0	0
Appendix 13b. cont.				
R3 e. My son and local members	1	10	0	0
R3 f. Local members and village elder	0	0	1	20
R3 g. All village women	1	10	0	0
R3 h. Missing response	2	20	1	20
<b>Q4. What does the group do?</b>				
R4 a. Farm work and funds raising	1	10	0	0
R4 b. Farm work	2	20	0	0
R4 c. Every kind of work	0	0	0	0
R4 d. Farm and construction work	0	0	0	0
R4 e. Farm big tasks	2	20	4	80
R4 f. Bee keeping	0	0	0	0
R4 g. Not applicable in my case	2	20	0	0
R4 h. Preaching work	0	0	0	0
R4 i. Dig well but work now dormant	1	10	0	0
R4 j. Senior member take-easy-tasks	1	10	0	0

Appendix 13b. Cont'd.

R4 k. Funds raising and banking	0	0	1	20
R4 l. Keeps honey bees	1	10	0	0
<b>Q5. Belonging or know any other group in Muuni?</b>				
R5 a. Yes: belong to a church group	0	0	0	0
R5 b. Yes: aware of others but not a member	3	30	3	60
R5 c. Yes: belong to other(s)	1	10	1	20
R5 d. No: do not belong to any	4	40	1	20
R5 e. No: not applicable in my case	2	20	0	0
R5 f. Missing response	0	0	0	0
<b>Q6. Meet members of Parent/Teacher Association (PTA)?</b>				
R6 a. Yes: every Tuesday for school work	7	70	5	100
R6 b. Yes: Tuesdays/Fridays for school work	0	0	0	0
R6 c. Yes: every Friday for school work	0	0	0	0
R6 d. No: do not meet them	2	20	0	0
R6 e. Missing response	0	0	0	0
R6 f. No: only my son every Tuesday for school work	1	10	0	0

Appendix 14b. Kalemwani men/women responses to "External organizations assistance", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

<b>Inquiry: External aid/assistance</b>	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Ever received external help/advice/assistance?</b>				
R1 a. Yes: from GOK, AMREF, GOI, Redeemed/Catholics	0	0	0	0
R1 b. Yes: from AMREF	10	100	5	100
R1 c. Yes: from GOK and AMREF	0	0	0	0
R1 d. Yes: in form of church group work	0	0	0	0
<b>Q2. Did the aid help?</b>				
R2 a. Yes: especially from AMREF/Government of India	0	0	0	0
R2 b. Yes: it did help	10	100	5	100
R2 c. Yes: especially from AMREF	0	0	0	0
R2 d. No: not applicable in my case	0	0	0	0

Appendix 14b. Cont'd.

Q3. What help would be needed now?				
R3 a. Oxen/Plow, water and loan	0	0	0	0
R3 b. Oxen/Plow and water	1	10	1	20
R3 c. Oxen/Plow and loan	0	0	0	0
R3 d. Oxen/Plow, water and land title deed	0	0	0	0
R3 e. Oxen/Plow, permanent house and water	9	90	2	40
R3 f. Water, loan and more land	0	0	0	0
R3 g. More land, tractor service and water	0	0	0	0
R3 h. Money, water and land title deed	0	0	0	0
R3 i. More land, water and land title deed	0	0	0	0
R3 j. Water, land title deed, loan and oxen/plow	0	0	0	0
R3 k. Water, oxen/plow and money	0	0	1	20
R3 l. School fees/books and oxen plow	0	0	1	20

Appendix 15b. Kalemwani men/women responses to "Life and future of Muuni settlement scheme", Muuni Settlement Scheme, Makueni District, Kenya, 1998.

Inquiry: Life/future of Muuni	No. of men responding (n=10)	%	No. of women responding (n=5)	%
<b>Q1. Is life in Muuni good or bad now?</b>				
R1 a. It is bad	0	0	0	0
R1 b. Would be good if there was water	6	60	5	100
R1 c. It is bad but .....	1	10	0	0
R1 d. It is bad because of Malaria	0	0	0	0
R1 e. Would be good if there was water and hospital	2	20	0	0
R1 f. Missing response	1	10	0	0
<b>Q2. Is Muuni future expected to improve or get worse?</b>				
R2 a. Get worse	0	0	1	20
R2 b. Improve	0	0	0	0
R2 c. Improve if water is available	10	100	4	80
R2 d. Improve if there is water and hospitals	0	0	0	0
R2 e. Improve if there is water and social amenities	0	0	0	0

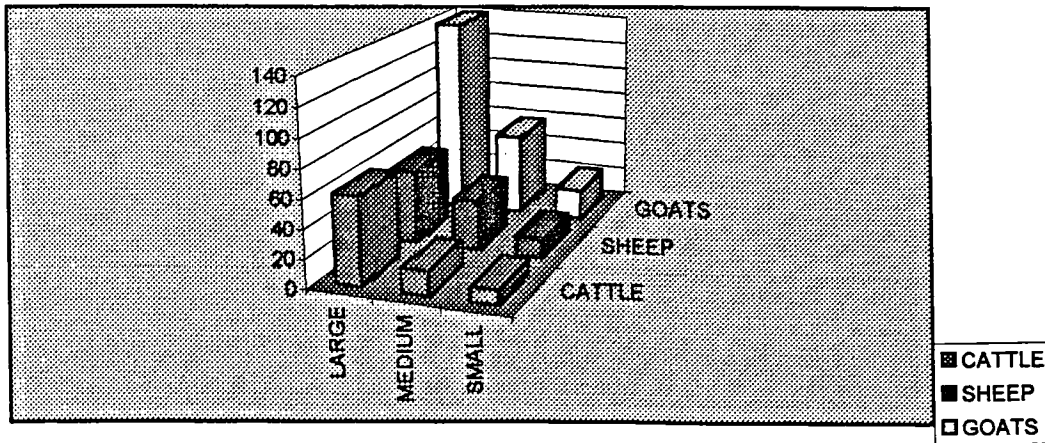
<b>Q3. What are expected changes by next year?</b>									
R3 a. Water/food/health/business situation to improve	0	0	0	0	0	0	0	0	0
R3 b. Water and food situation to improve	0	0	0	0	0	0	0	0	0
R3 c. Water situation to improve	0	0	0	0	0	0	0	0	0
R3 d. Food situation to improve	0	0	0	0	0	0	0	0	0
R3 e. Situation is unknown	0	0	0	0	0	0	0	0	0
R3 f. Kiosks and shops to increase	6	60	2	0	0	0	0	0	40
R3 g. Better changes if rain continues like this year	0	0	0	0	0	0	0	0	0
R3 h. Increased group cooperation	0	0	0	0	0	0	0	0	0
R3 i. Improved overall Muuni conditions	0	0	0	0	0	0	0	0	0
R3 j. Missing response	2	20	0	0	0	0	0	0	0
R3 k. Kiosks to increase	0	0	3	0	0	0	0	0	60
R3 l. Business to increase	1	10	0	0	0	0	0	0	0
R3 m. Better if rain continues and piped water develop	1	10	0	0	0	0	0	0	0
R3 n. Future is unknown	1	10	0	0	0	0	0	0	0
<b>Q4. What are expected changes in five years time?</b>									
R4 a. With aid ↑schools/water/hospitals & vice versa	0	0	0	0	0	0	0	0	0
R4 b. Treeless area in absence of water	0	0	0	0	0	0	0	0	0
R4 c. Treeless and desert-like	9	90	5	0	0	0	0	0	100
R4 d. Future unknown	0	0	0	0	0	0	0	0	0
R4 e. Better place if rain continues like this year	0	0	0	0	0	0	0	0	0
R4 f. Desert-like	0	0	0	0	0	0	0	0	0
R4 g. Missing response	1	10	0	0	0	0	0	0	0
R4 h. Only God knows the future	1	10	0	0	0	0	0	0	0
<b>Q5. What is most hoped for achievement next year?</b>									
R5 a. Develop business/commercial plot/green veg kiosk	0	0	0	0	0	0	0	0	0
R5 b. Build a better house	0	0	0	0	0	0	0	0	0
R5 c. Make/bake bricks for a better house	0	0	0	0	0	0	0	0	0
R5 d. Increase livestock	0	0	0	0	0	0	0	0	0
R5 e. Build a kiosk	0	40	1	0	0	0	0	0	20
R5 f. Start a kiosk business	4	0	0	0	0	0	0	0	0
R5 g. None hoped for	0	0	0	0	0	0	0	0	0
R5 h. Build a kiosk and start business	1	10	1	0	0	0	0	0	20
R5 i. Start a business	1	10	1	0	0	0	0	0	20
R5 j. Start a business and conserve soil on the farm	1	0	0	0	0	0	0	0	0
R5 k. Build a better house and buy a commercial plot	0	0	0	0	0	0	0	0	0
R5 l. Be able to buy a milk cow	0	10	0	0	0	0	0	0	0
R5 m. Start livestock trade involving goats	1	20	0	0	0	0	0	0	0
R5 n. Future is unknown	2	10	0	0	0	0	0	0	0



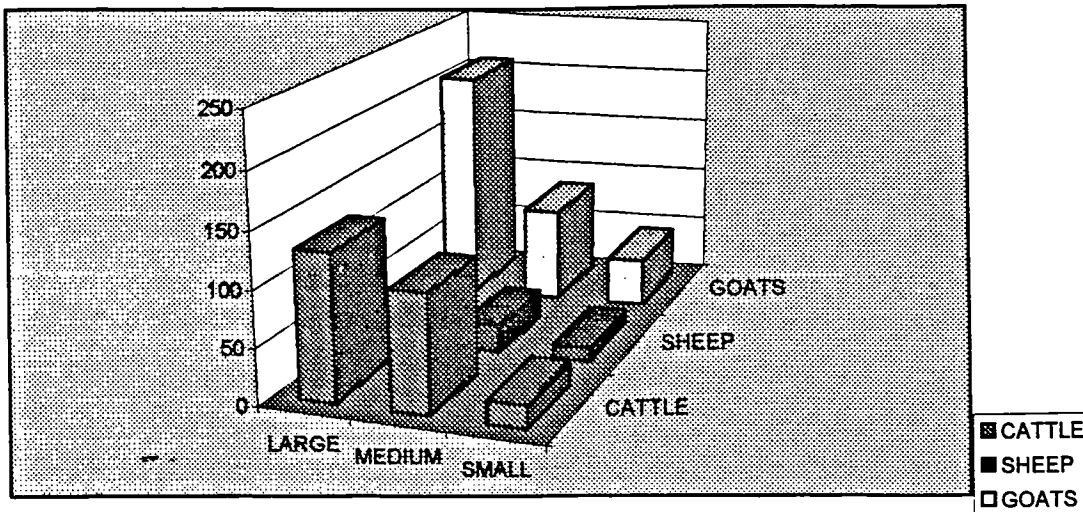
Appendix 15b. Cont'd.

R5 o. Start second-hand clothes business	1				0	1	20
R5 p. Start maize sale business	0				0	1	20
<b>Q6. What is most hoped for achievement in five years</b>							
R6 a. Ox/plow, develop business/plot, acquire new plot	0				0	0	0
R6 b. None hoped for	0				0	0	0
R6 c. Build permanent house	0				0	0	0
R6 d. Build permanent house and increase farm area	0				0	0	0
R6 e. Future is unknown	9				90	3	60
R6 f. Buy and increase land	0				0	0	0
R6 g. Missing response	0				0	0	0
R6 h. Too old to rely on future	1				10	0	0
R6 i. No hope unless rich/non-governmental bodies help	0				0	1	20
R6 j. Only God knows the future	0				0	1	20

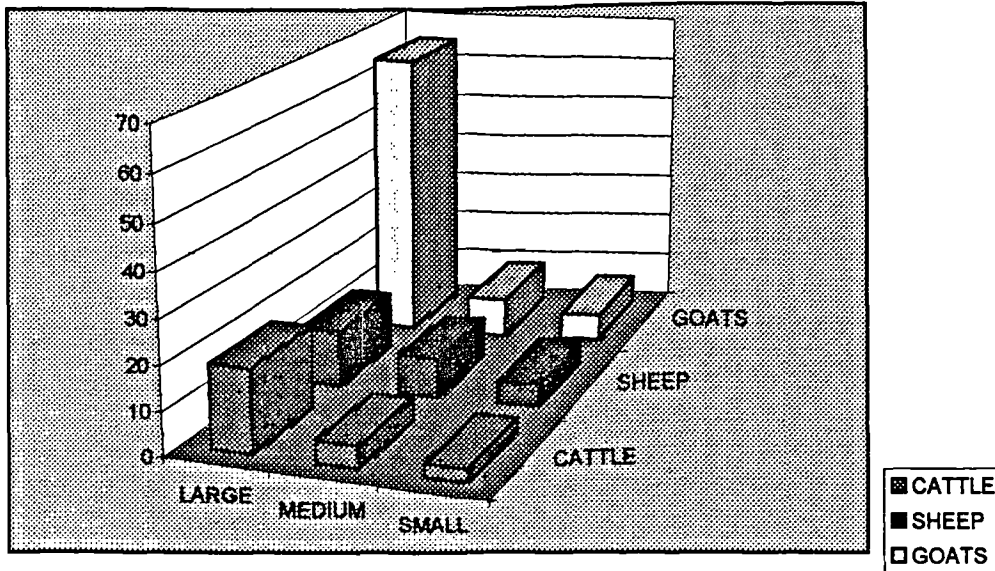
Appendix 16. Household pre-relocation Herd and Flock sizes in Chyulu Hills as reported by Men Focus Group Discussants (FGD), Muuni Settlement Scheme, Makueni District, Kenya, 1997.



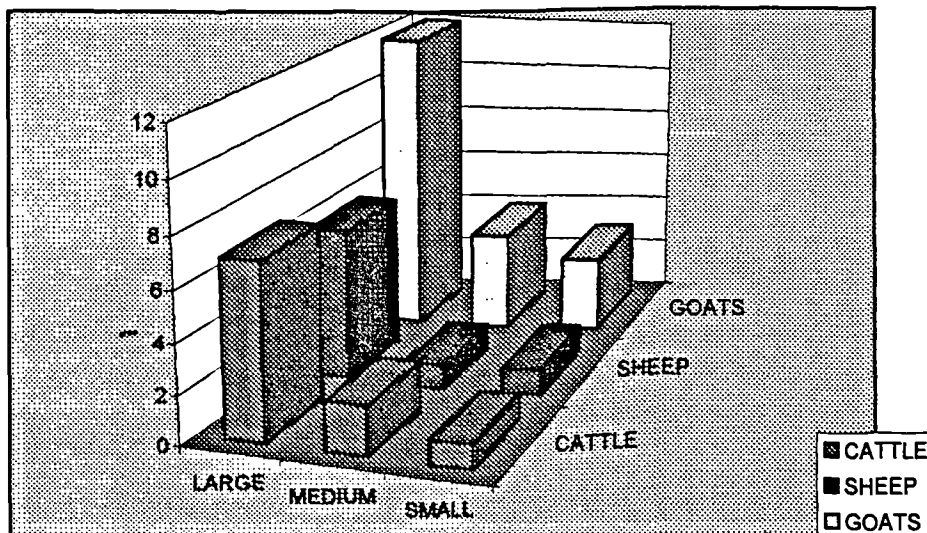
Appendix 17. Household pre-relocation Herd and Flock Sizes in Kalemchwani area as reported by Men Focus Group Discussants (FGD), Muuni Settlement Scheme, Makueni District, Kenya, 1997.



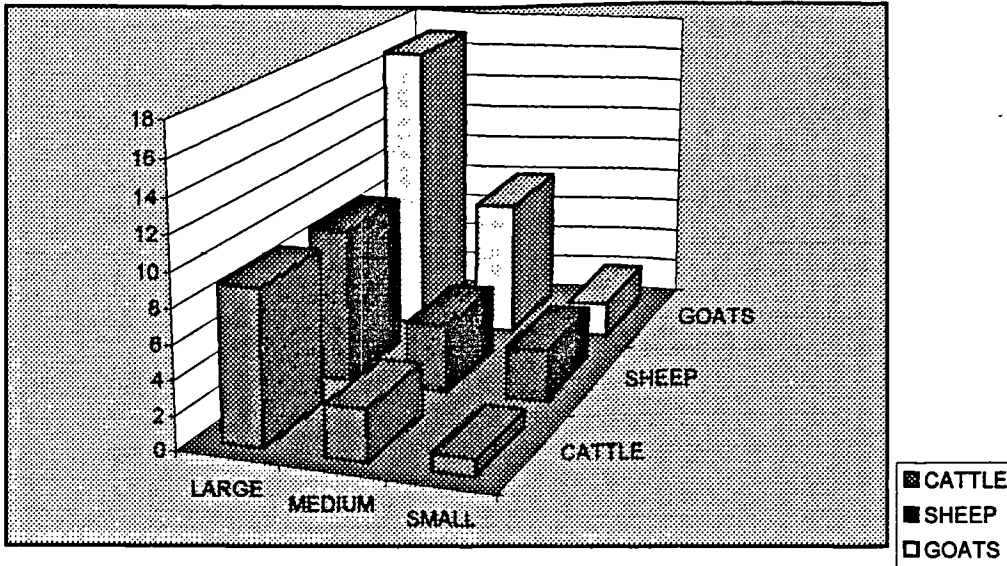
Appendix 18. Household post-relocation Herd and Flock sizes in Muuni as reported by Chyulu Men Focus Group Discussants (FGD), Muuni Settlement Scheme, Makueni District, Kenya, 1997.



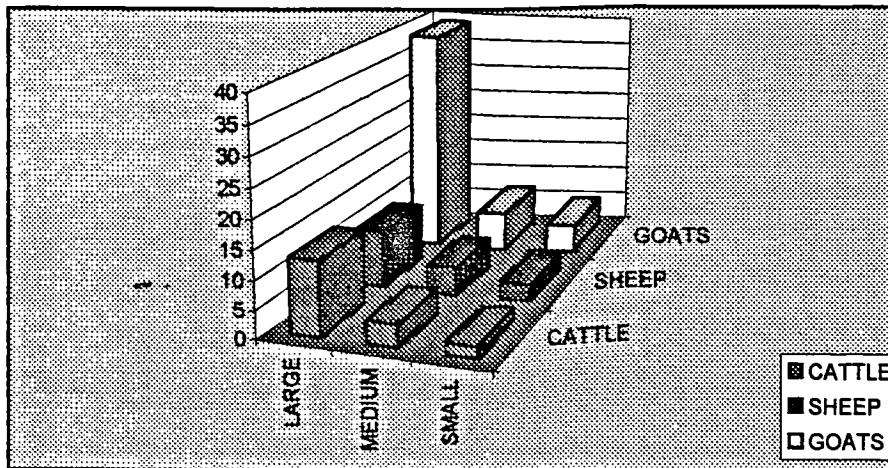
Appendix 19. Household post-relocation Herd and Flock Sizes in Muuni as reported by Kalembwani Men Focus Group Discussants (FGD), Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Appendix 20. Household post-relocation Herd and Flock Sizes in Muuni as reported by Muuni Village Elders, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Appendix 21. Mean post-relocation Household Herd and Flock Sizes in Muuni as reported by Chyulu and Kalembwani Focus Group Discussants (FGD), Muuni Settlement Scheme, Makueni District, Kenya, 1997.



MUUNI HOUSEHOLDS BACKGROUND INFORMATION:

Appendix 22. Household Family Structure by Age, Muuni Settlement Scheme, Makeni District, Kenya, 1997.

FARM CODE	AGE IN YEARS											REMARKS
	PARENTS		CHILDREN									
	HUSBAND	WIFE	<13	≤13	≥20	Σ ♂	Σ ♀	Dead ♂	Dead ♀			
01	28	26	4	-	-	1	3	-				
02	45	23	4	2	-	5	1	-				
03	75	60	5	-	2	2	11	1				8 daughters married
04	68	60	-	-	6	1	5	4	2			All none -residents except the only one married son; one married but separated daughter living on her own farm
05	34	30	5	-	-	3	2	1				
06	28	27	3	-	-	1	2	-				
07	46	41	6	1	1	7	1	-				
08	60	52	-	2	3	3	2	-				1 married daughter, one son employed as a mechanic in Mombasa, and two sons at home.
09	49	38	4	2	1	5	2	-				2 sons assist in farm work
10	42	35	4	1	-	3	2	-				
11	69	46	2	3	2	4	3	5-♂ & ♀				1 son work as tone boy; 1 daughter work as a maid in Mombasa
12	48	48	3	4	3	5	5	1-♂, and two miscarriages	2 ♀			1 son mechanic in Mombasa 2 daughters married
13	?	53	3	2	1	3	3					? = Single woman household; one daughter married















Appendix 24. Livestock structure and composition pre and post-relocation for Chyulu people, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FARM CODE	AREA	♀ COW >12 Yr.		♂ COW >2 Yr.		♀ COW <1 Yr.		♂ COW <1 Yr.		ADULT BUCK		YEARLING BUCK		ADULT EWE		YEARLING EWE		ADULT RAM		YEARLING RAM		♀ LAMBS		♂ LAMBS		♀ ASS		♂ ASS		HEN		BEE		REMARKS
01	Chyulu	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	6				
01	Muuni	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	5					
02	Chyulu	0	0	0	0	0	0	6	3	8	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	2				
02	Muuni	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	All sold			
03	Chyulu	0	0	1	0	2	0	10	5	4	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0				
03	Muuni	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0				
04	Chyulu	0	0	0	0	0	0	70	6	28	0	18	18	5	2	6	0	0	0	0	0	0	0	0	0	0	0	0	100	18				
04	Muuni	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	All sold for food			
05	Chyulu	0	0	0	0	0	0	4	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0				
05	Muuni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	Not in apairy			
06	Chyulu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
06	Muuni	0	0	0	0	2	0	2	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0				
07	Chyulu	0	0	0	0	0	0	3	4	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	6				
07	Muuni	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1				
08	Chyulu	0	0	0	0	0	0	4	1	3	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	15	0				
08	Muuni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0				
09	Chyulu	0	0	0	0	0	0	9	1	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0				
09	Muuni	1	2	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	2				
10	Chyulu	0	0	1	1	0	0	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130	0				
10	Muuni	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1				





Appendix 25a. Household Head Non-farm Occupation, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FARM CODE	MALE OCCUPATION	FEMALE OCCUPATION
01	Carpenter	None
02	Watchman	None
03	Carpenter (Deceased)	Witch doctor
04	Sheet metal worker	Witch doctor
05	None	None
06	Occasional casual labour seeker	None
07	Part-time farm employee	None
08	Transport business (separated from wife)	None
09	None	None
10	None (Family deserter)	None
11	Herbalist /Berber	None
12	Pastor (deceased)	Women group leader
13	-	Raw food sale trade (single family)
14	Kiosk operator	None
15	Push bicycle repairer (deceased)	None
16	Livestock trader	None
17	Casual wage earner/ex-transport driver	None
18	Family deserter	None
19	Butcher (deceased)	None
20	Laundry man (deceased)	Farm casual labour
21	Charcoal seller	None
22	Livestock trader/Charcoal seller	None
23	None (Widower)	-
24	Mechanic/Storeman (deceased)	None
25	Tone-boy/wood carver	None
26	None (deceased)	None
27	Carpenter	None
28	Mason	2 <sup>nd</sup> wife = Ex-adult education teacher
29	None (Separated from wife)	None (Forced child marriage)
30	Witch doctor	None

Appendix 25b. Household Children Non-farm Occupation, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FARM CODE	SONS' OCCUPATION	DAUGHTERS' OCCUPATION
01	None	None
02	None	None
03	Wage earners (2)*	None
04	Kiosk operator (1)	Sex-trade (1); French bean sale (1)
05	None	None
06	None	None
07	None	None
08	Wage earner (1)	None
09	None	None
10	None	None
11	Tone-boy (1)	House maid (1)
12	Mechanic (1)	None
13	None	None
14	None	None
15	None	None
16	None	None
17	None	None
18	None	House maid (1)
19	None	None
20	None	Forced house maid job (1)
21	None	None
22	None	None
23	None	None
24	Casual labour speculator (1)	None
25	None	None
26	Wage earners (2); College teacher (1)	Green vegetable trader (1)
27	Public transport conductor (1)	None
28	<i>Catha edulis</i> traders (2); Wage earner (1)	None
29	None	None
30	None	None

\* = Numbers in ( ) represent sons or daughters involved.



Appendix 26a. Crop yield for Long rain season, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

NAME/CODE/SOIL	CROP	MIXTURE	ACRES	YIELD (KG)	COMMENTS	RAIN (mm) wef. MAY 15-JUL. 31, 1997	
Julius Mutua/01/*R-S	Maize	SINGLE	1	N/A		48	
		MZ,BN	0.1	„			
		MZ,CP	0.35	„			
		MZ,GG	0.14	„			
		MZ,SM	0.42	„			
					630		
	Beans	BN,MZ	0.1	1.8			
	Cow peas	SINGLE	0.07	20			
		CP,MZ	0.35	31			
					51	Aphid attack	
	Green grams	GG,MZ	0.14	11			
	Sorghum	SM,MZ	0.42	180			
Kilfu Kaindi/02/**B-S	Maize	SINGLE	2.6	N/A		49	
		MZ,CP	0.1	„			
		MZ,PP	0.59	„			
		MZ,PP,GG	0.15	„			
					135		
	Cow peas	CP,MZ	0.1	5			
	Pigeon peas	PP,MZ	0.59	N/A			
		PP,MZ,GG	0.15	N/A			
				10			
	Green gram	GG,MZ,PP	0.15	8			
Minoo Mwei/03/BS	Maize	SINGLE	1.08	N/A		48	
		MZ,CP	0.3	„			
		MZ,CP,SM	0.3	„			
		MZ,SM	1.81	„			
					270		
	Cow peas	CP,MZ	0.3	N/A			
		CP,MZ,SM	0.3	„			
					37		
Sorghum	SM,MZ	1.81	„				
	SM,MZ,CP	0.3	„				
				270			
Nzeveia Muinde/04/RS	Maize	MZ,SM	1.47	90		50	
	Sorghum	SINGLE	0.31	N/A			
		SM,MZ	1.47	„			
				75			

Appendix 26a. Cont'd.

Simon Muema/05/ East=R-S; West=B-S	Maize	MZ,CP	1.67	N/A		23
		MZ,GG	0.06	„		
		MZ,SM	0.21	„		
					900	
	Cow Peas	CP,MZ	1.67		225	
	Green gram	GG,MZ	0.06		3	
		GG,SM	0.24		17	
					20	
	Sorghum	SINGLE	1.93	N/A		
		SM,MZ	0.21	„		
		SM,GG	0.24	„		
					450	
	Finger millet	FM	0.13		15	
Milka John/06/ R-S	Maize	MZ,BN,SM	1.11	N/A		53.5
		MZ,CP	1.04	„		
		MZ,SM	1.38	„		
					540	
	Beans	BN,MZ,SM	1.11		40	
	Cow peas	CP,MZ	1.04		20	
	Sorghum	SINGLE	0.14	N/A		
		SM,MZ	1.38	„		
		SM,MZ,BN	1.11	„		Scattered stands
					50	
Munyambu Kituku/07/ R-S	Maize	MZ,BN	0.08	N/A		48.5
		MZ,CP,SM	1.88	„		
		MZ,GG,SM	1.16	„		
		MZ,SM	0.15	„		
					293	
	Beans	BN,MZ	0.08		20	
	Cow peas	CP,MZ,SM	1.88		5	Aphid attack
	Green gram	GG,MZ,SM	1.16		60	
	Sorghum	SM,MZ	0.15	N/A		
		SM,MZ,CP	1.88	„		
		SM,MZ,GG	1.16	„		
					135	
Susan W. Mutua/08/ B-S	Maize	SINGLE	0.71	N/A		41
		MZ,CP	0.54	„		
		MZ,GG	0.07	„		
					450	
	Cow peas	CP,MZ	0.54		50	
	Green gram	GG,MZ	0.07		8	
	Sorghum	SINGLE	0.09		15	

Appendix 26a. Cont'd.

Cosmas Muthuku/09/ R-S	Maize	MZ,BN	0.44	N/A		42
		MZ,PP	4.22	„		
					1350	
	Beans	SINGLE	0.13		80	
		BN,MZ	0.44		20	
					100	
	Cow peas	SINGLE	0.09		40	
	Green gram	SINGLE	0.02		20	
	Pigeon peas	PP,MZ	4.22	?		
Mbengwa Musyoka/10/ R-S	Maize	SINGLE	0.74	N/A		8
		MZ,BN	0.15	„		
		MZ,CP	0.19	„		
		MZ,SM	0.66	„		
					60	
	Beans	BN,MZ	0.74		5	
	Cow peas	CP,MZ	0.19		2	
	Sorghum	SM,MZ	0.66		20	on sold land
Priscia Mwanthe/11/ East=B-S; West=R-S	Maize	SINGLE	0.94	N/A		19
		MZ,CP,GG,SM	0.6	„		
		MZ,GG	0.18	„		
		MZ,SM	0.48	„		
					50	
	Cow peas	CP,MZ,GG,SM	0.6		2	Aphid attack
	Green gram	GM,MZ	0.18		3	
		GG,MZ,CP,SM	0.6		0.5	
					3.5	
	Sorghum	SINGLE	0.67	N/A		Unweeded
		SINGLE	0.16	„		Weeded
		SM,MZ	0.48	„		
		SM,MZ,CP,GG	0.6	„		
					50	

Appendix 26a. Cont'd.

Luka Maingi/12/ B-S Mainly	Maize	MZ,BN	0.04	N/A		51
		MZ,CP	0.78	„		
		MZ,GG	0.09	„		
		MZ,SM,PP	1.26	„		
					540	
	Bean	BN,MZ	0.04		5	
	Cow peas	CP,MZ	0.78		25	Aphid attack
	Green gram	GG,MZ	0.09		23	Scattered stands
	Pigeon peas	PP,MZ,SM	1.26		40	Scattered stands
	Sorghum	SM,MZ,PP	1.26		270	
Lydia Peter/13/ R-S	Maize	SINGLE	0.02	N/A		33
		MZ,BN	0.03	„		
		MZ,CP	0.15	„		
		MZ,GG,CP,SM	0.35	„		
					20	
	Bean	BN,MZ	0.03		15	
	Cow peas	CP,MZ	0.03	N/A		
		CP,MZ	0.12	„		Scattered stands
		CP,MZ,GG,SM	0.35	„		
					2	Aphid attack
	Green gram	GG,MZ,CP,SM	0.35		1	
Dominic M. Mathuva/14/ R-S	Maize	SINGLE	0.17	N/A		62
		MZ,BN	0.54	„		
		MZ,CP	0.2	„		
		MZ,GG	0.07	„		
		MZ,GG,SM	0.67	„		
		MZ,SP	0.1	„		
					495	
	Beans	BN,MZ	0.54		20	
	Cow Peas	CP,MZ	0.2		7	
	Green gram	GG,MZ	0.07		15	
	Sorghum	SS,MZ,GG	0.67		20	
	Sweet potato	SP,MZ	0.1		50	

Appendix 26a. Cont'd.

Safina Ndeto/15/ East=B-S; West=R-S	Maize	MZ,BN	0.03	N/A		38
		MZ,BN,SM	0.05	„		
		MZ,CP,GG	0.63	„		
		MZ,SM	0.62	„		
		MZ,CP,SM	0.63	„		
		MZ,GG,SM	0.13	„		
					450	
	Beans	BN,MZ	0.03		10	Scattered stands
		BN,MZ,SM	0.05		10	
					20	
	Cow peas	CP,MZ,GG	0.63	N/A		
		CP,MZ,SM	0.63	„		
		CP,GG,SM	0.39	„		
					28	Aphid attack
	Green gram	GG,MZ,CP	0.63	N/A		
		GG,MZ,SM	0.13	„		
					45	
	Sorghum	SINGLE	0.02	N/A		
		SM,MZ	0.62	„		
		SM,MZ,CP	0.63	„		
		SM,MZ,GG	0.13	„		
		SM,CP,GG	0.39	„		
					153?	
Philip Matee/16/ B-R-S	Maize	SINGLE	0.34	N/A		40
		MZ,BN	1.13	„		
		MZ,CP	0.07	„		
		MZ,SM	0.25	„		
					450	
	Beans	BN,MZ	0.74	N/A		Scattered stands
		BN,MZ	0.39	„		
					42	
	Cow peas	CP,MZ	0.07		2	Aphid attack
	Sorghum	SM,MZ	0.25		20	
Kimitu Suvu/17/ R-S	Maize	MZ,BN,PP	0.92	N/A		32
		MZ,CP,PP	0.36	„		
		MZ,BN,CP,SM	0.64	„		
		MZ,GG,PP	0.31	„		
		MZ,GG,SM	0.1	„		
		MZ,PP	0.15	„		
					50	

Appendix 26a. Cont'd.

	Beans	BN,MZ,PP	0.92	50		
		BN,MZ,CP,SM	0.64	4		
				54		
	Cow peas	CP,MZ,PP	0.36	N/A		
		CP,MZ,BN,SM	0.64	„		
				1.5	Aphid/hen attack	
	Green grams	GG,MZ,PP	0.31	20		
		GG,MZ,SM	0.1	4		
				24		
	Sorghum	SM,MZ,BN,CP	0.64	N/A		
		SM,MZ,GG	0.1	„		
				20		
	Pigeon peas	PP,MZ	0.15	N/A		
		PP,MZ,BN	0.92	„		
		PP,MZ,BN,SM	0.64	„		
		PP,MZ,CP	0.36	„		
		PP,MZ,GG	0.31	„		
				2		
Kalonde Meja/18/ B-S	Maize	MZ,CP,SM	4.97	90	Scattered stands	31
		MZ,BM,	0.52	50		
				140	I Lack of moisture	
	Cow peas	CP,MZ,SM	4.97	36	I Lack of moisture	
	Bulrush millet	BM,MZ	0.52	16	I Lack of moisture	
Mwikali Mutungi/19/ R-S	Maize	MZ,CP	0.13	N/A		22
		MZ,CP,PP	1.72	„	Daughter's farm portion	
		MZ,GG	0.18	„	Daughter's farm portion	
				360		
		MZ,GG,SM	0.37	N/A		
		MZ,SM,PP	3.73	„		
				180		
	Cow peas	CP,MZ	0.13	N/A		
		CP,MZ,PP	1.72	„		
				35		

Appendix 26a. Cont'd.

	Green grams	GG,MZ	0.18	10	Daughter's farm portion	
		GG,MZ,SM	0.37	20		
				30		
	Sorghum	SM,MZ,GG	0.37	N/A		
		SM,MZ,PP	3.73	„		
				40		
	Pigeon peas	PP,MZ,CP	1.72	N/A	Scattered stands	
		PP,MZ,SM	3.73	„		
				10		
	Okra	SINGLE	0.66	40		
Veronica Muunda/20/ R-S	Maize	SINGLE	0.73	N/A		31
		MZ,CP,PP	0.12	„		
		MZ,GG	0.03	„		
		MZ,GG,PP	0.19	„		
		MZ,PP	0.27	„		
				90	Maize stock borer	
	Cow peas	CP,MZ,PP	0.12	4		
		CP,SM,PP	0.46	10		
				14	Eaten when green	
	Green gram	GM,MZ	0.03	5		
		GG,MZ,PP	0.19	4		
				9		
	Pigeon peas	PP,MZ	0.27	N/A		
		PP,MZ,CP	0.12	„		
				4		
Mutisya Masila/21/ R-S	Maize	SINGLE	0.05	N/A		20
		MZ,BN	0.53	„		
		MZ,CP	1.16	„		
		MZ,CP,SM	0.69	„		
				180		
	Beans	BN,MZ	0.53	50		
	Cow peas	CP,MZ	1.16	10		
		CP,MZ,SM	0.69	5		
				15	Aphid attack	
		SM,MZ,CP	0.69	50		
Gregory Muoki/22/ R-S	Maize	MZ,CP	1.01	N/A		25.5
		MZ,GG	1.33	„		
				540		
	Cow peas	SINGLE	0.04	20		
		CP,MZ	1.01	30		
		CP,SM	1.07	10		
				60		

Appendix 26a. Cont'd.

	Green grams	GG,MZ	1.33	70		
	Sorghum	SM,CP	1.07	140		53.5
Kyengo Lukya/23/ R-S	Maize	SINGLE	2.54	N/A		
		MZ,BN	0.22	„		
		MZ,BN,SM	0.04	„		
		MZ,GG	0.11	„		
		MZ,SM	0.26	„		
		MZ,SM,BM	0.04	„		
		MZ,BM,	0.01	„		
				200		
	Beans	BN,MZ	0.16	60		
		BN,MZ,SM	0.06	20		
				80		
	Green grams	GG,MZ	0.11	0.11		
	Sorghum	SM,MZ	0.26	0.26		
		SM,MZ,BM	0.04	0.04		
	Bulrush millet	BM,MZ	0.01	1		
Rose Kaswi/24/ R-S	Maize	SINGLE	0.32	NA		38
		MZ,BN	1.44	„		
		MZ,CP	0.94	„		
		MZ,SM	1.55	„		
				630		
	Beans	BN,MZ	1.44	80		
	Cow peas	CP,MZ	0.94	100		
	Sorghum	SM,MZ	1.55	90		
Peter Munyala/25/ R-S	Maize	MZ,CP,SM	1.5	20	For Peter	30
		MZ,CP,SM	1.5	20	For Luka	
				40		
	Cow peas	CP,MZ,SM	1.5	10	Peter's farm = well planted	
		CP,MZ,SM	1.5	1	Luka's farm = insufficient seeds	
				11		
	Sorghum	SM,MZ,CP	1.5	90	For Peter	
		SM,MZ,CP	1.5	90	For Luka	
				180		
Waki Kieti/26/ *IR-B-S	Maize	SINGLE	1.75	NA	Lack of moisture	23.5
		MZ,BN	0.39	„		
		MZ,GG	0.29	„		
		MZ,CP	1.07	„		
				50		
	Beans	BN,MZ	0.39	4	Lack of moisture	
	Green grams	SINGLE	0.12	3	Lack of moisture	



Appendix 26a. Cont'd.

		GG,MZ	0.29	1.5		
				4.5		
	Cow peas	SINGLE	0.05	4	1	Lack of moisture
		CP,MZ	1.07	2	1	Aphid attack
				6		
	Sorghum	SINGLE	0.21	36	1	Lack of moisture
Kyanguu Nzivo/27/ B-S	Maize	SINGLE	1.86	NA		18
		MZ,CP	0.31	„		
		MZ,GG	0.23	„		
				90	1	Lack of moisture
	Cow peas	CP,MZ	0.31	10	1	Lack of moisture
	Green grams	GG,MZ	0.23	3	1	Lack of moisture
Katola Musyoki/28/ **!B-R-S	Maize	MZ,BN	0.09	NA		19.5
		MZ,CP,PP	0.31	„		1st. wife
		MZ,PP	2.72	„		1st. wife
				315		1st. wife
		MZ,BN	0.08	NA		2nd. wife
		MZ,CP,PP	1.1	„		2nd. wife
		MZ,PP	1.22	180		2nd. wife
				495		Total for 1st.& 2nd wife
	Beans	BN,MZ	0.09	1		1st. wife
		BN,MZ	0.08	2		2nd. wife
				3		1st.& 2nd wife
	Cow peas	CP,MZ,PP	0.31	4		1st.wife = Aphid attack
		CP,MZ,PP	1.1	3		2nd. wife
				7		1st.& 2nd wife
	Green grams	GG,MZ,PP	0.68	6.5		1st. wife
	Pigeon peas	PP,MZ	2.72	NA		1st. wife
		PP,MZ,CP	0.31	„		1st. wife
				5		1st. wife
		PP,MZ	1.56	NA		2nd wife
		PP,MZ,CP	1.1	„		2nd wife
		PP,MZ,GG	0.57	„		2nd wife
				18		2nd. wife
				23		1st.& 2nd wife
Mukulu Nzevela/29/ R-S	Maize	MZ,CP	0.69	NA		20
		MZ,GG	0.22	„		
		MZ,SM	0.08	„		
		MZ,SM,BM	0.12	„		
		MZ,PP,BB	0.67	„		
				60		

Appendix 26a. Cont'd.

	Cow peas	CP,MZ	0.69	0	Aphid attack	
	Green grams	GG,MZ	0.22	1.5		
	Sorghum	SM,MZ	0.08	NA		
		SM,MZ,BM	0.12	„		
				20		
	Bulrush millet	BM,MZ,SM	0.12	0.5		
	Black beans	BB,MZ,PP	0.67	0	Eaten while green; Scattered stands.	
		PP,MZ,BB	0.67	0	Caterpillar spoilage	
Koki Muema/30/ R-S	Maize	SINGLE	0.83	NA		31.5
		MZ,BN	0.57	„		
		MZ,BN,CP,GG,SM	0.31	„		
		MZ,CP,GG,SM	0.72	„		
		MZ,SM	0.36	„		
		MZ,SM,BM	0.63	„		
				90		
	Beans	BN,MZ	0.57	N/A		
		BN,MZ,CP,GG,SM	0.31	„		
				3		
	Cow peas	CP,MZ,BN,GG,SM	0.31	N/A		
		CP,MZ,GG,SM	0.72	„		
				10		
	Green grams	GG,MZ,BN,CP,SM	0.31	N/A		
		GG,MZ,CP,SM	0.72	„		
				5		
	Sorghum	SM,MZ	0.36	N/A		
		SM,MZ,BN,CP,SM	0.31	„		
		SM,MZ,CP,SM	0.72	„		
		SM,MZ,BM	0.63	„		
				140		
	Bulrush millet	BM,MZ,SM	0.63	20		

\*R-S = Red-Sandy Soil; \*\*B-S = Black-Sandy Soil; \*!R-B-S = Red-Black Soil; \*\*!B-R-S = Black-Red Soil

Appendix 26b. Crop yield for Short rain season, Muuni Settlement Scheme, Makueni district, Kenya, 1997.

NAME/CODE/SOIL	CROP	MIXTURE	ACRES	TOTAL YIELD (KG)	SPOILAGE (KG)	CLEAN YIELD (KG)	COMMENTS	RAIN (mm) wef. OCT. 1 - DEC. 31, 1997
Julius Mutua /01/*R-S	Maize	CP	3.5	1800	270	1530		755
	Beans	MZ	1	90	70	20		
	Sorghum	MZ	0.25	180	0	180		
	Green grams	MZ,BN	0.2	30	10	20		
	Cow peas	MZ	0.25	80	30	50		
Kiilu Kaindi/02/**B-S	Maize	BN,CP	4	1350	None	1350		793
	Beans	MZ,CP	0.2	5	„	5		
	cow peas	MZ,BN,	4	0	0	0	El-Nino	
	Sorghum	SINGLE	0.25	90	„	90		
Minoo Mwei (Jak)/03/B-S	Maize	SINGLE	2	1350	180	1170	El-Nino; Termites	763
		BN	1	720	None	720		
		CP	3	810	„	810		
		GG	0.5	90	„	90		
				2970	180	2790		
	Beans	MZ	0.5	90	20	70	El-Nino	
	Cow peas	MZ	2	360	90	270	„	
	Green grams	MZ	0.5	40	10	30	„	
	Sorghum	MZ	0.25	40	None	40		
Nzevela Muinde/04/R-S	Maize	GG,SM	0.75	180	None	180		704
	Beans	MZ	0.2	NONE	3	0		
	Cow peas	MZ	0.5	60	30	30		
	Green grams	MZ	0.25	NONE	40	0		
	Sorghum	MZ	0.2	40	None	40		
Simon Muema/05/ East=R-S; West=B-S	Maize	BN,CP	6	2700	540	2160		666
	Bean	MZ,CP	1.05	96	90	6		
	Cow peas	MZ,BN	4.95	350	200	150		
Milka John/06/R-S	Maize	BN,CP,GG,S M	5	900	450	450		709
	Beans	MZ,BN,GG,S M	2	270	90	180		
	Cow peas	MZ,BN,GG,S M	0.5	60	20	40		
	Green grams	MZ,BN,SM	0.25	60	48	12		
	Sorghum	MZ,BN,GG	1	270	None	270		
	Finger millet	MZ,GG,SM	0.5	20	„	20		

## Appendix 26b. Cont'd.

Munyambu Kituku/07/ R-S	Maize	BN,GG	4.5	2250	180	2070		704
	Beans	SINGLE	1	405	270	135		
	Cow peas	MZ	0.5	45	40	5		
	Green grams	MZ	0.25	23	20	3		
	Sorghum	MZ	1	405	270	135		
	Finger millet	SINGLE	0.25	110	100	10		
Susan W. Mutua/08/ B-S	Maize	BN,CP,	4.5	1620	450	1170	El-Nino; Caterpillar	563
	Beans	MZ,CP	0.75	80	70	10	..	
	Cow peas	MZ	0.5	80	75	5	..	
Cosmas Muthuku/09/ R-S	Maize	SINGLE	5	3150	900	2250		668
	Beans	..	1.75	630	360	270		
	Cow peas	..	0.25	60	40	20		
	Green grams	..	0.25	50	40	10		
Mbengwa Musyoka/10/ R-S	Maize	CP	2.5	720	180	540		524
	Beans	MZ	0.5	90	87	3		
	Cow peas	MZ	2.5	182	180	2		
	Green grams	MZ	0.2	120	80	40		
Priscila Mwanthe/11/ East=B-S; West=R-S	Maize	BN,CP,SM	4	1800	900	900		719
	Maize	BN,CP	2.75	2700	360	2340		
				4500	1260	3240		
	Beans	MZ	2.5	270	140	130		
	Cow peas	SINGLE	0.5	90	45	45		
	Cow peas	MZ	0.25	80	10	70		
				170	55	115		
	Green grams	SINGLE	0.2	18	12	6		
	Sorghum	MZ,GG	0.5	135	45	90		
Luka Maingi/12/ B-S Mainly	Maize	BN,GG,SM	1.5	810	135	675		770
	Beans	MZ,CP,GG,S M	0.25	60	30	30		
	Cow peas	MZ,GG,SM	0.7	120	50	70		
	Green grams	MZ,CP,SM	0.25	40	20	20		
	Sorghum	MZ,BN,CP,G G	0.25	135	None	135		

## Appendix 26b. Cont'd.

Lydia Peter/13/R-S	Maize	BN,CP	2	810	180	630		980
	Beans	MZ,CP	0.25	60	30	30		
	Cow peas	MZ	0.75	80	20	60		
	Green grams	MZ,SM	0.2	20	15	5		
	Sorghum	MZ	0.25	90	32	58		
Dominic M. Mathuva/14/R-S	Maize	BN,CP,GG	4.25	3000	200	2800		568
	Beans	MZ,CP,GG,	4.25	2700	180	2520		
	Cow peas	MZ,BN,GG	4.25	50	10	40		
	Green grams	MZ,BN,CP	4.25	270	90	180		
Safina Ndeto/15/ East=B-S; West=R-S	Maize	BN	2.5	270	90	180		648
	Beans	MZ,CP	0.25	270	180	90		
	Cow peas	MZ	0.75	200	110	90		
	Green grams	MZ,SM	0.2	15	10	5		
	Sorghum	MZ	0.25	90	None	90		
Philip Matee/16/ **!B-R-S	Maize	BN,GG	7	1800	None	1800		1622
	Beans	MZ,SM	1	360	40	320		
	Cow peas	MZ	0.5	110	90	20		
	Green grams	MZ	0.25	60	40	20		
	Sorghum		0.25	90	None	90		
Kimitu Sui/17/R-S	Maize	BN	3.75	900	270	630		610
	Beans	MZ	1	270	180	90		
	Cow peas	MZ	1	90	40	50		
	Green grams	MZ	0.25	80	40	40		
	Sorghum	MZ	0.25	130	90	40		
Kalondeu Meja/18/ B-S	Maize	BN,CP	4	2520	180	2340		646
	Beans	MZ	0.5	180	45	135		
	Green grams	MZ	0.5	NONE	None	0		
Mwikali Mutungi/19/ R-S	Maize	BN,CP,GG	3	4050	2970	1080		513
	Bean	MZ,CP,GG	3	500	450	50		
	Cowpeas	MZ,BN,GG	3	450	430	20		
	Green gram	MZ,BN,CP	3	450	15	430		
Veronica Muunda/20/ R-S	Maize	BN,CP,GG,S M	2.25	900	270	630	El-Nino	614
	Beans	MZ	0.5	70	30	40		
	Cow peas	MZ	0.5	180	90	90		
	Green grams	MZ	0.3	40	38	2		
	Sorghum	MZ	0.6	40	10	30		

## Appendix 26b. Cont'd.

Mutisya Masila/21/ R-S	Maize	BN,GG	2.2	500	None	500	1035
	Beans	MZ,GG	2.2	300	90	210	
	Green grams	MZ,BN	2.2	2700	180	2520	
Gregory Muoki/22/ R-S	Maize	BN,CP	2	3240	90	3150	737
	Beans	MZ,CP,GG	2	250	150	100	
	Cow peas	MZ,SM	0.5	270	100	170	
	Green grams	MZ	0.25	20	10	10	
	Sorghum	MZ	0.25	40	None	40	
Kyengo Lukya/23/ R-S	Maize	CP	2	540	40	500	1488
	Cow peas	MZ	1	90	30	60	
	Green grams	MZ	0.2	5	2	3	
	Sorghum	MZ,CP	0.25	50	None	50	
Rose Kaswii/24/ R-S	Maize	BN	2	1350	180	1170	698
	Beans	MZ	1	370	360	10	
	Cow peas	MZ	1	220	180	40	
	Sorghum	MZ	0.5	90	None	90	
Peter Munyala/25/ R-S	Maize	BN,CP	3	1170	270	900	709
	Beans	MZ	1	135	90	45	
	Beans	MZ,CP	0.5	180	45	135	
	Cow peas	MZ	0.75	110	40	70	
	Sorghum	SINGLE	0.25	135	45	90	
Waki Kieti/26/1 R-B-S	Maize	BN,CP	4	1710	630	1080	714
	Beans	MZ	0.25	99	90	9	
	Cow peas	MZ	0.25	180	90	90	
	Green grams	MZ	0.2	NONE	None	0	
	Sorghum	MZ	0.25	54	25	29	
Kyanguu Nzivo/27/ B-S	Maize	BN,CP,SM,F M	3	1620	450	1170	619
	Beans	MZ	1	270	90	180	
	Cow peas	MZ	0.25	180	60	120	
	Sorghum	MZ	0.25	80	20	60	
	Millet	MZ	0.25	45	40	5	
Katoia Musyoki/28/ B-R-S	Maize	CP	4	1350	270	1080	696
	Beans	MZ	0.25	135	90	45	
	Cow peas	MZ	1	270	60	210	
	Green grams	MZ	0.25	68	40	28	
	Sorghum	MZ	0.2	180	None	180	

Appendix 26b. Cont'd.

Mukulu Nzeveta/29/ R-S	Maize	BN	2	900	360	540	800
	Beans	MZ	0.25	83	80	3	
	Cow peas	MZ	0.2	20	20	0	
	Green grams	MZ	0.2	40	40	0	
	Sorghum	MZ	0.2	130	110	20	
Koki Muema/30/R-S	Maize	BN,GG	2.5	150	20	130	494
	Beans	MZ,GG	2.5	20	2	18	
	Green grams	MZ,BN	2.5	10	1	9	

\*R-S = Red-Sandy Soil; \*\*B-S = Black-Sandy Soil; \*!R-B-S = Red-Black Soil; \*\*!B-R-S = Black-Red Soil

Appendix 27. Typical Pre-test Focus Group Participation in Kaunguni area, Makueni District, Kenya, 1997.

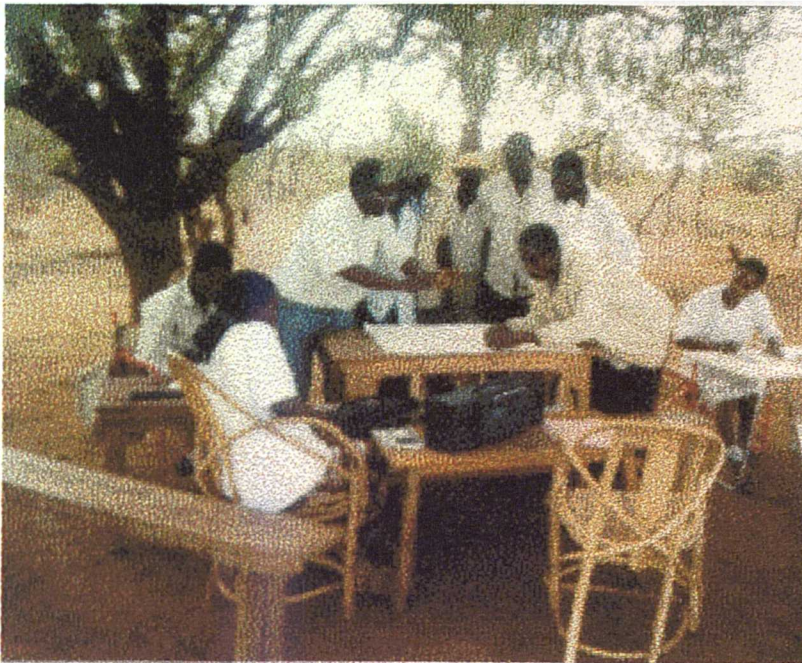




Appendix 27b. Typical women pre-test Focus Group participation in Kaunguni area, Makueni District, Kenya, 1997.



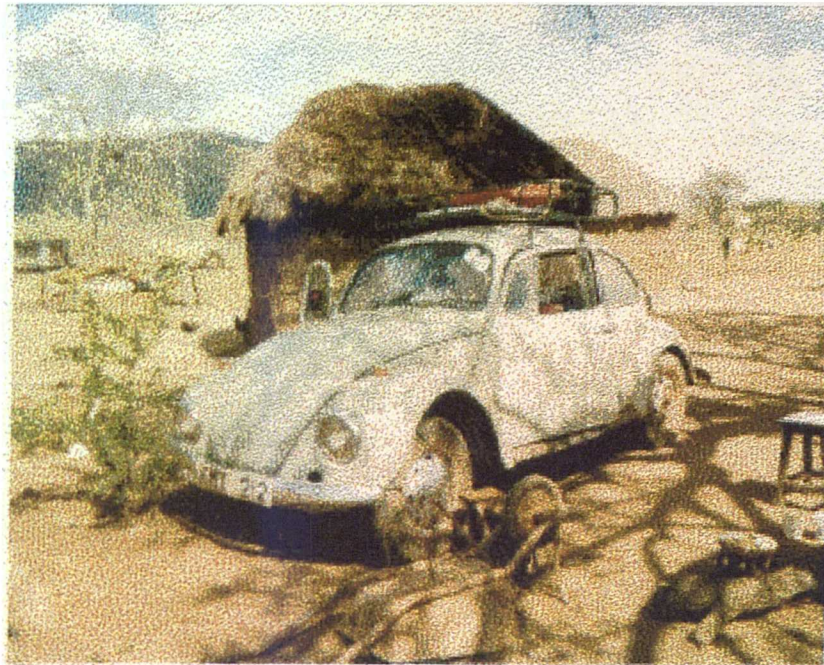
Appendix 28. Study investigator giving instructions on how to use maize grains in estimating certain study parameters, Muuni Settlement Scheme, Makeni District, Kenya, 1997.



Appendix 29. Photograph showing a treeless state of Muuni following resettlement, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



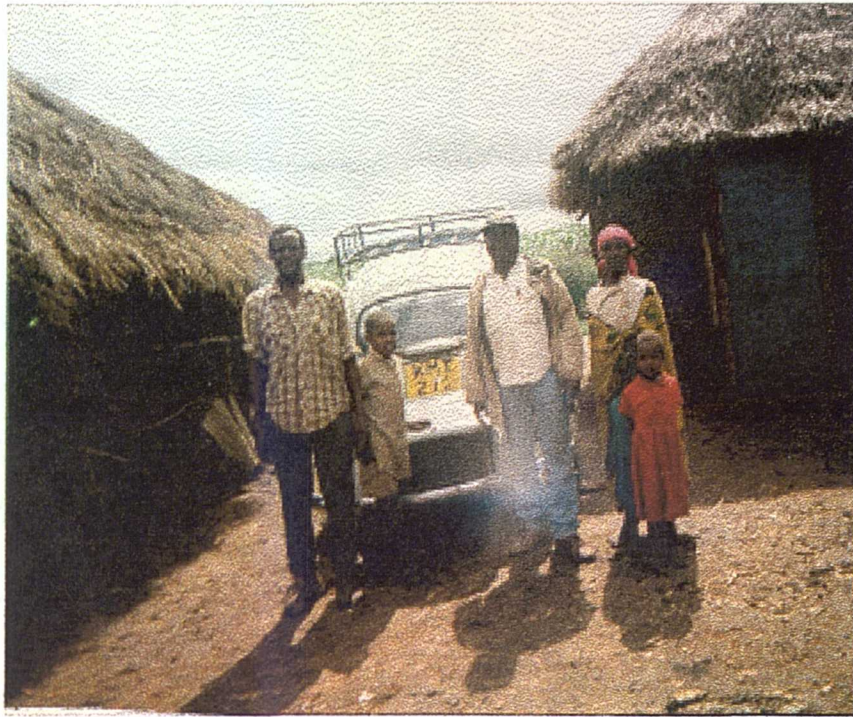
Appendix 30. Typical Muuni house and the lava flow area at the background, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Appendix 31. Typical Single Family homestead, Muuni Settlement Scheme, Makeni District, Kenya, 1997.



Appendix 32. The study investigator (in a headcap) with a family in Kalembwani area, Makueni District, Kenya, 1997.



Appendix 32b. Typical extended family in Kalembwani area, Makueni District, Kenya, 1997.

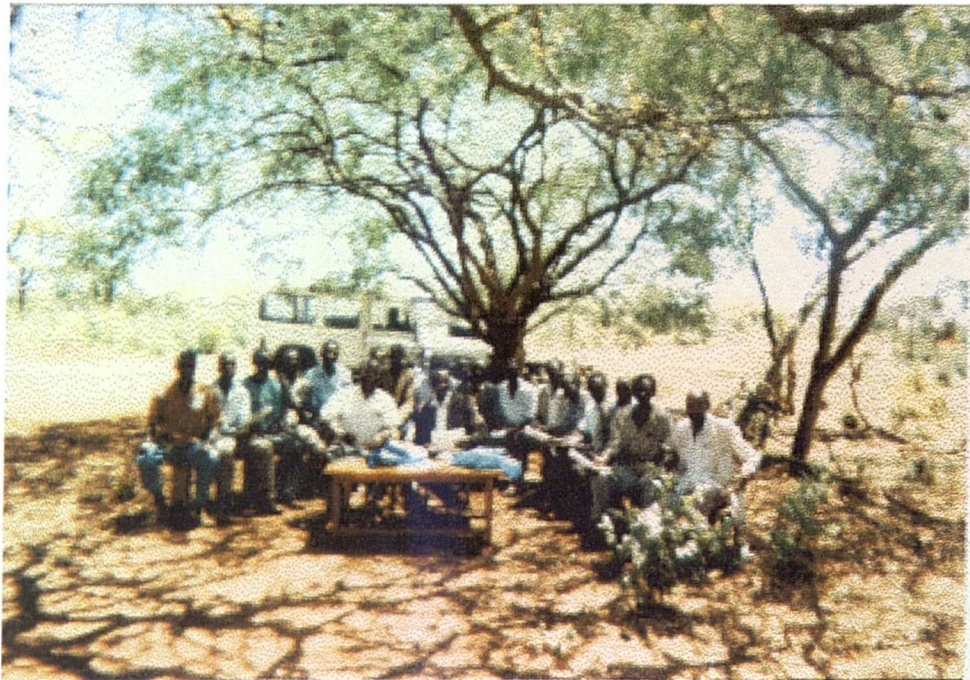


Appendix 33. Crude rain water catchment method used by some householders, Muuni Settlement Scheme, Makueni District, Kenya, 1997.





Appendix 34. Typical study onset meetings held between the local leaders and the study investigators, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Appendix 35a. Government Famine Relief Food distribution Centre at Ilatu township, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Appendix 35b. People waiting to receive their Famine Relief Food rations, Muuni Settlement Scheme, Makeni District, Kenya, 1997.



Appendix 35c. Men cycling home their Famine Food Relief rations, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Appendix 35d. Women carrying home their Famine Relief Food rations, Muuni Settlement Scheme, Makueni District, Kenya, 1997.



Appendix 36. Sequential Settlement Matrix for the 30 study responding householders, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

FARM CODE	ANCESTRAL SETTLEMENT AREA	SECOND SETTLEMENT AREA	THIRD SETTLEMENT AREA	FOURTH SETTLEMENT AREA	FIFTH SETTLEMENT AREA	CURRENT SETTLEMENT AREA	MARITAL YEAR
01	Mbitini until 1978.	Chyulu Hills until 1992.	-	-	-	Block 3, Pipeline village, Muuni	1989
02	Mukaa	Chyulu Hills until 1992	-	-	-	Block 2, Makuluni village, Muuni	1982
03	Kilungu	Chyulu Hills until 1992.	-	-	-	Block 3, Mukameni village, Muuni	~1948 (husband deceased wef. 1994)
04	Kilungu until 1968.	Makindu until 1972.	Chyulu Hills until 1992	-	-	Block 3, Mukameni village, Muuni	1945
05	Maitiku	Chyulu Hills until 1992	-	-	-	Block 2, Muarani village, Muuni	1984
06	Kitui	Sultan Hamud	Chyulu Hills until 1992	-	-	Block 2, Kyandulu village, Muuni	1990
07	Mbuvo, Makueni	Chyulu Hills until 1992	-	-	-	Block 2, Kyandulu village, Muuni	1977
08	Mukaa	Chyulu Hills until 1992	-	-	-	Block 4, Uvileni village, Muuni	1963 (separated)
09	Kilungu	Kwa-selu, Makindu	Chyulu Hills until 1992	-	-	Block 4, Uvileni village, Muuni	1974
10	Kasambani, Wote	Chyulu Hills until 1992	-	-	-	Block 4, Kithirmani village, Muuni	1983 (husband deserted family)

Appendix 36. Cont'd.

11	Mukaa	Mitito-Andei	Chyulu Hills until 1992	-	-	Block 1, Katulani village, Muuni	1970
12	Kangundo until 1966	Kindaruma, Yatta until 1973	Kambu until 1976	Chyulu Hills until 1986	Chyulu Foothill shanty dwelling until 1992	Block 1, wiwia village, Muuni	1966 (husband decease wef. July, 1998 ) Single
13	Muwani, Sultan Hamud	Kyale, Makindu (5 years)	Chyulu Hills until 1992	-	-	Block 2, Ilatu village, Muuni	1984
14	Mbitini	Chyulu Hills until 1992	-	-	-	Block 1, Syungani village, Muuni	1964 (husband decease wef 1988)
15	Kilungu	Kambu (5 years)	Chyulu Hills until 1992	-	-	Block 1, Syungani village, Muuni	1985
16	Kathonzweni, Makueni	Chyulu Hills until 1992	-	-	-	Block 1, Syungani village, Muuni	2 <sup>nd</sup> wife, 1982 (has children); 1 <sup>st</sup> wife lives in Masongaleni (childless)
17	Kathonzweni, Makueni	Kalima Koi, Ngwata	Chyulu Hills until 1992	-	-	Block 1, Ivoleni village, Muuni	1959 (husband deserted family)
18	Mbitini	Chyulu Hills until 1992	-	-	-	Block 4, Kiuwani village, Muuni	1972 (husband decease wef 1996
19	Kilungu until 1979	Kambu until 1983	Chyulu Hills until 1992	-	-	Block 3, Wimboo village, Muuni	1978 (husband decease wef. 1993-suicide)
20	Kilala	Kali, Kiboko	Chyulu Hills until 1992	-	-	Block 3, Ndivuni village, Muuni	

Appendix 36. Cont'd.

21	Nzau	Chyulu Hills until 1992	-	-	-	-	Block 2, Iliu village, Muuni	1993 (divorced the first wife) 1992
22	Mbuvo, Makueni until 1976	Maikuu, Kibwezi until 1981	Chyulu Hills until 1992	-	-	-	Block 3, Wimboo village, Muuni	1992
23	Kilungu	Chyulu Hills until 1992	-	-	-	-	Block 3, Nguswinyi village, Muuni	1977 (wife deceased wef. 1993)
24	Mukaa	Katuluni, Makindu (3 years)	Chyulu Hills until 1992	-	-	-	Block 3, Ndivuni village, Muuni	1972 (husband deceased wef. 1995)
25	Nguomo	Kaunguni	Chyulu Hills until 1992	-	-	-	Block 4, Kiuwani village, Muuni	1976
26	Kangundo until 1957	Sultan Hamud until 1974	Chyulu Hills until 1992	-	-	-	Block 1, Katulani village, Muuni	1957 (husband deceased wef. May, 1997)
27	Warunyu	Chyulu Hills until 1981	Taveta until 1983	Chyulu Hills until 1992	-	-	Block 4, Kithimani village, Muuni	1 <sup>st</sup> wife, 1953 but deceased wef. 1964; 2 <sup>nd</sup> wife, 1961.
28	Mukaa	Chyulu Hills until 1992	-	-	-	-	Block 5, Katangini village, Muuni	1 <sup>st</sup> wife, 1972 2 <sup>nd</sup> wife, 1974
29	Muaani, Sultan Hamud	Kyale, Makindu	Kilema	Kithasyu	Chyulu Hills until 1992	Chyulu Hills until 1992	Block 5, Katangini village, Muuni	Given to marriage 10 years before puberty, grew to adulthood, got 3 children, divorced in 1974.
30	Nzau	Kibwezi	-	-	-	-	Block 1, Ivoleni village, Muuni	1 <sup>st</sup> wife, 1961 (husband lives with 2 <sup>nd</sup> wife at Ngvata)



Appendix 37. Historical Settlement Matrix and socio-economic activities thereof for farmer code 12, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

ACTIVITIES	Kangundo until 1965	Kindaruma, Yatta until 1970	Chyulu Hills until 1986	Chyulu Foothill shanty dwelling until 1992	Muuni Settlement wef. 1992
<b>Livestock husbandry</b>	<ul style="list-style-type: none"> <li>-Practiced zero grazing</li> <li>-Kept only one grade dairy cow</li> <li>-Had a shallow well at home</li> <li>-Concentrate feeding was common</li> <li>-Could only sell progeny</li> </ul>	<ul style="list-style-type: none"> <li>-Forage limiting in dry season</li> <li>-Permanent river Tana nearby</li> <li>-Forage damage by termites was common.</li> <li>-Livestock diseases common</li> </ul>	<ul style="list-style-type: none"> <li>-Best for livestock because forage was abundant and evergreen</li> <li>-There was water near by</li> <li>-Livestock sold in Kambu market when necessary</li> </ul>	<ul style="list-style-type: none"> <li>-Livestock herds and flocks got depleted due to lack of grazing area and sale for food and other basic needs</li> <li>-Night illegal grazing at Chyulu Hills</li> <li>-Living conditions intolerable for both livestock and human</li> </ul>	<ul style="list-style-type: none"> <li>-Land too small for grazing</li> <li>-Water availability very critical</li> <li>-Muuni is worst for livestock keeping</li> </ul>
<b>Gender farm production roles</b>	<ul style="list-style-type: none"> <li>-Land was scarce and of small size</li> <li>-Zero grazing was mainly men's work</li> <li>-Land tillage was done by adult men and women</li> <li>-Children did not usually do farm work because farms were small</li> <li>-Among food grown was maize, beans, sweet potatoes, arrowroots, sugar cane and fruit.</li> </ul>	<ul style="list-style-type: none"> <li>-Difficult virgin bush clearing work</li> <li>-Children were used to scare monkeys away from farm and also help in farm work because farms were big</li> </ul>	<ul style="list-style-type: none"> <li>-The main work was farming, livestock keeping and making charcoal and all family members were involved</li> <li>-Children looked after livestock when not in school</li> <li>-There were no schools for the first 3 years of my settlement because people were in fear of authority</li> <li>-Women fetched water and firewood assisted by children when available</li> </ul>	<ul style="list-style-type: none"> <li>-Live was uncertain</li> <li>-I bought 3 acres but was too small for the family</li> <li>-Other people lived in shanties</li> </ul>	<ul style="list-style-type: none"> <li>-Bush clearing done by men mainly</li> <li>-Women fetch water and later some men bought bicycles and started fetching water</li> <li>-Men and women are involved in making charcoal</li> <li>-Children used to fetch firewood and scare away monkeys when not in school.</li> </ul>
<b>Housing</b>	<ul style="list-style-type: none"> <li>-Brick and iron sheet permanent houses common</li> </ul>	<ul style="list-style-type: none"> <li>-Typical traditional Kamba mud and thatch grass house</li> </ul>	<ul style="list-style-type: none"> <li>-Semi-permanent house (mud walls and iron sheet roof)</li> </ul>	<ul style="list-style-type: none"> <li>-Typical traditional Kamba mud and thatch grass house</li> </ul>	<ul style="list-style-type: none"> <li>-Typical traditional Kamba mud and thatch grass house</li> </ul>
<b>Social sharing, services and information</b>	<ul style="list-style-type: none"> <li>-Women groups were common and they shared the resources and contributions among them especially in time of needs such as sickness</li> <li>-People were close by and communication was easy and quick</li> </ul>	<ul style="list-style-type: none"> <li>-Men groups were formed to help in bush clearing</li> <li>-Were displaced by hydro-power project in 2 years time.</li> <li>-Communication was house-to-house and information was delivered by village elders but this was voluntary work</li> </ul>	<ul style="list-style-type: none"> <li>-Spirit of sharing was greater in Chyulu because there were many social groups and resources</li> <li>-Village elders were paid by the community so as to serve people with current social, technical and political information.</li> <li>-House-to-house communication was necessary for those who lived far off.</li> </ul>	<ul style="list-style-type: none"> <li>-No organized social group spirit</li> <li>-Communication was based on gossip and uncertain future</li> </ul>	<ul style="list-style-type: none"> <li>-Many social groups especially women's eventually sprang up and helped in farming and other social needs.</li> <li>-My wife is a leader of one of the women groups</li> <li>-Group objectives are not always met due to scarcity of resources</li> <li>-Communication is easy because people live in closed community and meet at watering places always</li> <li>-Village elders are also active in passing the information to people.</li> </ul>

Appendix 37. Cont'd.

<p><b>Social disputes</b></p>	<p>-Disputes arose among neighbours due to crop damage by chicken mainly. Crop damage by cow was minimal. Small ruminants were not common. -Dispute solutions were handled mainly in courts of law because people were rich and highly developed.</p>	<p>-No social disputes encountered during the short settlement period in this area -People were busy trying to settle down.</p>	<p>-Fewer small disputes existed but were mainly solved within family circles -I have had a dispute with a neighbour who threatened to attack me with a machete on demanding the reason for trespassing on my land and cut trees. The fact that I am a religious man and indeed a pastor helped me to arrive at peaceful solution to this dispute. -Cases of theft if reported were handled by the provincial administration</p>	<p>-No room for disputes because the original Chyulu foothill community sympathized with the evicted community -No social order existed because people lived in fear of the unknown future</p>	<p>-Notorious for social disputes due to poverty -Disputes arise in form of property trespass such as boundary encroachment, crop damage by livestock and witchcraft. -Provincial administration is used to resolve conflicts.</p>
<p><b>Dietary habits</b></p>	<p>-Food was balanced but was inadequate -Most food was purchased and people did not have their fill -Casual work was common and augmented household food requirement</p>	<p>-Maize and beans composed main diet -Green vegetables were available in wet seasons -Fruit was scarce</p>	<p>-People enjoyed filling well balance diet composed of maize and other grains, pulses, tubers and fruits.</p>	<p>-People ate whatever was available on daily basis -No social order existed because people lived in fear of the unknown future</p>	<p>-Maize and pulses are the main diet ingredients when available -No green vegetable except during rainy season -No fruit unless purchased from the market -Casual labour, charcoal making and sale, firewood and water sale are common in augmenting household food needs.</p>
<p><b>Marital institution</b></p>	<p>-Marriage was unstable because both men and women had to find a job outside family circles in order to make a living. This was because land was very small</p>	<p>-Marriage was successful because land was big and enough food and livestock could be raised and this prospect kept families working hard together. I only had one wife married in 1966. -My three baby daughters, and a twin boy died here. Also My wife has had two miscarriages while in this area.</p>	<p>-Marriage was more stable here than anywhere else due to abundance of essential household resources. -My second born daughter died in 1972 at the age of 6 years due to measles.</p>	<p>-Family cohesion was highly threatened by lack of essential resources. -No social order existed because people lived in fear of the unknown future</p>	<p>-Marriage unstable because of high level of poverty -Three of my children not school-going because 2 are married and one is employed. (I have 1 married son living in Mombasa with his wife and 2 married daughters) -My third-born daughter died in 1996 at the age of 20 years due to Malaria. -All together I have 10 living children and 6 dead children</p>

Appendix 37. Cont'd.					
<b>Folk dances</b>	-Common only during public day celebrations or when evoking their animistic gods -Other times people are very busy.	-No folk dances because people were endeavoring to settle down first	-People often enjoyed folk dances especially to celebrate plentiful harvest yearlong.	-No social order existed because people lived in fear of the unknown future	-Very rare because food ingredients, such as grain and pulses, beer and meat required for popular Kamba folk dance ( <i>Kirumi</i> ), are rare
<b>Education</b>	-Child education highly valued -School infrastructure well developed	-Schools were far off because the area was new and virgin. People were trying to settle down first.	-There were no nearby schools the first 3 years of settlement but eventually schools were put up as the fear of the authority ebbed away.	-Children were scattered in various Chyulu downhill schools but schooling was not stable. -No social order existed because people lived in fear of the unknown future	-People started making temporary school structures as soon as they started settling down. -Some old former KARI buildings were converted to schools. -Some NGO assisted in primary school development -No secondary school in Muuni.
<b>Religion</b>	-Almost everybody is a church goer	-Churches had not been constructed. Only a few temporary worship buildings were starting to come up.	-Many churches were put up by foreign missionaries and many people were attending their services often.	-No social order existed because people lived in fear of the unknown future -Church going was there but irregular.	-Temporary churches are many but people do not attend in big numbers -People are busy minding about their families' welfare -Other people prefer to stay at home or loiter around rather than going to the church.
<b>Politics</b>	-Politics is based on the need to high level development of the community structure	-No active politics -People were busy trying to settle down	-Mature politics was exercised because the would be politician did not give bribes to be elected. This was because people were self-sufficient	-No social order existed because people lived in fear of the unknown future	-Poverty leads to much worthless politics -Many people struggle to become leaders though they have no leadership concept
<b>Property ownership</b>	-People compete to own capital items such as commercial plots, permanent homesteads, grade coffee growing	-Priority was to first settle down on our new farms	-People struggled to own property such as water tanks and, increase livestock numbers.	-The salvaged household property following eviction got depleted either through sale in order to support the family, theft and misplacement -No social order existed because people lived in fear of the unknown future	-Normally Kamba people in their traditional setting struggle to own many livestock. Livestock ownership is the measure of their social order. -In Muuni small land sizes and harsh environment discourage this behavioral pattern. -People are mindful of their day-to-day dietary and medical requirement.

Appendix 37. Cont'd.

<p><b>Food security</b></p>	<p>-Household food security was augmented by savings from wage earnings</p>	<p>-Farm household food security was augmented in dry season by fishing from the nearby river Tana, charcoal making and sale, and casual employment by the hydro-electric project</p>	<p>-This was not an issue. Simply people had plenty.</p>	<p>-No social order existed because people lived in fear of the unknown future. Simply people had no reliable food security system.</p>	<p>-Farm food production when available must be carefully rationed until there is another harvest if possible because rainfall is erratic and unreliable. -Charcoal making and sale, and casual labour engagement augment meager household food resources if they are there at all.</p>
<p><b>Witch craft and Development</b></p>	<p>-People are more concerned about development than witchcraft though a few might be practicing it in the hiding</p>	<p>-Priority was to first settle down on our new farms</p>	<p>-The original Chyulu Hills people, the <i>Wangulias</i> practiced and strongly believed in witch craft. -They opposed development because they are hunters mainly and they do not want any development that can bring government agents near them since hunting is illegal. -It is alleged that any one attempting to bring development near them must face the wrath of <i>Wangulias</i> witch craft power for instance,  Case 1. An AMREF driver was bewitched and died when he started constructing a good house. His son, a headmaster at a local school was bewitched and deserted his job. He now eats <i>Caritha edulis</i>, a bush found on the Chyulu Hills locally known as miraa, an unbecoming habit for an upright Kamba man. His daughter, a medical worker at Mito-Ardei was bewitched and died.</p>	<p>-The Kamba chief witch doctor lives in one of the foothill villages at <i>Kikunduku</i>. There are hundreds of people who go to him every day with the hope of having their problems solved. People waste a lot of time being with this chief witch, a time that should be used in gainful development.</p>	<p>-People threaten others by invoking witch powers or use of <i>Kithiu</i>, an alleged deadly witch craft used to resolve deep secret disputes. They also threaten to invoke the powers of the local chief witch at <i>Kikunduku</i>. These practices put people in fear of self-development in case someone might want to bewitch you out of envy.</p>

Appendix 37. Cont'd.			<p>Case 2. Two women engaged in maize buying and selling were bewitched and died in two consecutive days—their crime: envied as result of self-development spirit.</p> <p>Case 3. A woman buying and selling maize, second-hand clothes and banana from Taita-Taveta had her lip bewitched and became askewed—her crime: envied due to self-development spirit</p> <p>Case 4. A charcoal selling boy was bewitched and became mad—his crime: engaging in a duel with a <i>Wangula</i> boy.</p>		
<b>ROAD END FOR LUKA MAINGI</b>	In July, 1998, one month after having successfully concluded my field data collection with the assistance offered by devoted hard-working Luka Maingi, he finally succumbed to a long period liver sickness and died at Muuni leaving behind his poor and helpless wife and a multitude of both her own children and a couple of grand children. [LUKA MAINGI, 1949-1998: see Plate 11 & 11b.]				

Appendix 38. Historical Settlement Matrix and socio-economic activities thereof for farmer code 16, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

ACTIVITIES	Kilungu	Kamba (5years)	Chyulu Hills until 1986	Chyulu Foodhill abanty dwelling until 1992	Muuni Settlement wef. 1992
<b>Livestock husbandry</b>	-Livestock keeping was affected by small land sizes	-Livestock keeping was affected by small land sizes because there many brothers sharing land	-Small ruminants did very well in the abundance of browse	-Life was very hard and hopelessness was the order of the day.	Livestock keeping is critical especially in dry season and also due to small land size.
<b>Gender farm production roles</b>	-Normal women and men duties -children assist their parents when not in school	-Normal women and men duties -children assist their parents when not in school	-Normal women and men duties -children assist their parents when not in school	-Normal women and men duties -children assist their parents when not in school	-Normal women and men duties -children assist their parents when not in school
<b>Housing</b>	-	-	-	-	-
<b>Social sharing, services and information</b>	-Well organized social grouping	-Good social interaction and sharing system	-Social interaction was not automatic but available if requested for	Hopelessness was the order of the day.	-Social interaction and sharing is poor
<b>Social disputes</b>	-Were handled by provincial administration	-Were handled by provincial administration	-Were handled by provincial administration	-People had no particular clear cut line of command for they had no area to identify with.	-Were handled by provincial administration
<b>Dietary habits</b>	-Plentiful food supported by good weather	-Fairly sufficient food	Food was plenty in kind and varieties	-Life was uncertain and people struggled for each days rations	-Availability of food depends on the availability of rainfall
<b>Marital institution</b>	-Was married in 1964 as the only wife. My husband died in 1988. -Marriage was difficult because hard work involved in production process -Lost 2 daughters, one 6 months old in 1965 and the other 4 months old in 1969 through death due to pneumonic malaria -My first husband died in 1978	-Farm work was relatively easy to do and so marriages remained intact in this area	-Marriages were difficult because of the long distance traveled to fetch water	Hopelessness was the order of the day and maintaining a marriage was extremely hard.	-Muuni marriages are hard to maintain due to small land sizes and big families -My first son is married and has 3 daughters and 2 sons. He has a farm in Block 1. -My second son is married and has one daughter. He has a farm in Block 1. -My third son is married and has 1 daughter and 2 sons. He lives with me on my farm in Block 1. -All in all I have 3 living sons and two dead daughters.
<b>Folk dances</b>	-Less incidences of folk dances	-Occasionally, people enjoyed folk dances such as <i>kirami</i>	-No traditional dances because people were scattered far and wide.	-No time for that. People worried about their day-to-day survival	-Occasional folk dances to ask for rain and to give thanks when rains come are performed
<b>Education</b>	-	-	-	-	-

Appendix 38. Cont'd.

<b>Religion</b>	-There was enough rainfall so people did not need to go to church to pray. -Politics were not common because Kilungu was far away from the main Nairobi-Mombasa highway	-People were more religious because they needed their god to give them rain -More politics due to proximity of Nairobi-Mombasa highway	-People had plentiful food/rain and did not need to be very religious -Politics were not common because Chyulu Hills were far away from the main Nairobi-Mombasa highway -People owned small ruminants and crop farms.	-People worry about their day-to-day household dietary need than anything else -People worry about their day-to-day household dietary need than anything else	-People are very religious because they got free land and so want to thank their god. -More politics due to proximity of Nairobi-Mombasa highway -Some people own shoat
<b>Property ownership</b>	-People owned farms, cattle and small ruminants	-People owned farms, cattle and small ruminants	-People owned small ruminants and crop farms.	-People lived in shanty houses and their livestock got almost depleted. They had no crop farms after eviction from the Chyulu Hills -Sale of livestock for those who had them -Any other possible way of obtaining household daily ration.	
<b>Food security</b>	-Horticulture due to favourable rainfall -Water sale in town -Growing of maize and beans	Based on -Crop farming -Livestock keeping -wage earning	Based on: -Crop farming -Livestock keeping	Based on: -Charcoal making and sale -Crop farming -Livestock keeping -Casual labour earnings -Water sale	
<b>Witch craft and development</b>					

Appendix 39. Daily rainfall as recorded by 30 study responding householders from mid-May, 1997 to May 1998 and shown in Decals, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

DATE	Day to Decal																														
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
01 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 May 97	21	20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decal	22	21.5	36	37	1	25	11	14	16	18	5	0	25.5	15	20	22	15	11	0	0	10	0	26	17.5	12	0	4	4.5	4	14	
21 May 97	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22 May 97	10	5	5	4	2	7	5	5	5	5	2	3	13	4	6	4	4	0	0	6	0	0	0	0	0	0	0	0	0	0	0
23 May 97	6	7.5	4	5	10	12	12	11	12	0	8	3	0	13	7	10	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0
24 May 97	0	5	3	2	6	5.5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25 May 97	0	2.5	0	2	1	2.5	0.5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
27 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
28 May 97	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
29 May 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30 May 97	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
31 May 97	24	21	12	13	10	27	33.5	21	18	3	12	21.5	15	28	18	18	13	16	22	0	18	15	23	16	19.5	15	12	12	15	14	
Decal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
05 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
06 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
08 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25 Jun 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	









Appendix 39. Cont'd.

Day to Decal

Date	130	151.5	94	124	134	126	143	48	116.5	76	85	119.5	276	129	77	400	100	174	0	112	155	142	460	141	128	127	110	170	112	85									
01-Jan-08	17	5	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
02-Jan-08	10	0	10	16	14	25	16	0	30	60	14	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
03-Jan-08	5	10	10	18	14	25	16	0	30	60	14	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
04-Jan-08	7	20	20	12	17	15	4	0	23	10	21	3	16	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
05-Jan-08	6	0	15	22	13	22	20	0	40	5	0	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
06-Jan-08	10	5	20	10	17	16	4	0	30	15	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
07-Jan-08	8	40	10	28	18	32	5	0	40	40	0	26	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
08-Jan-08	15	25	30	37	15	21	7	24	15	15	0	20	0	24	5	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
09-Jan-08	7	11	20	37	15	21	7	24	15	15	0	20	0	24	5	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-Jan-08	168	160	165	100	126	170	126	74	103	245	181	97	200	178	76	166	6	7	200	114	125	287	355	200	166	127.5	145	198	28	21	151	151	151	151					
11-Jan-08	60	5	50	40	60	65	57	40	40	100	85	26	0	20	0	67	40	76	14	53	75	74	35	45	91	88	40	80	130	15	15	15	15	15					
12-Jan-08	33	0	60	40	38	40.5	37	16	40	25	35	0	0	35	24	30	0	18	10	12	0	40	38	55	15	0	20	75	15	20	20	20	20	20					
13-Jan-08	13	0	60	45	8	12	11	64	17	90	45	13	0	10	15	71	0	66	15	12	0	15	40	15	15	0	0	25	50	15	20	20	20	20	20				
14-Jan-08	72	40	20	40	63	60.5	40	0	64	0	0	0	0	10	18	18	40	3	10	15	0	40	46	63	70	12	45	60	20	135	18	18	18	18					
15-Jan-08	47	20	0	0	3	0	0	34	0	15	0	0	0	0	10	18	40	3	10	15	0	40	54	3	5	40	60	20	28	20	20	20	20	20	20				
16-Jan-08	47	15	0	81	53	54	53	0	77	20	0	13	16	6	5	5	7	13	14	5	3	63	40	85	32	70	4	70	5	16	5	16	5	16					
17-Jan-08	8	25	0	2	5	8.5	10	12	0	15	0	0	0	0	7	4	4	4	0	0	0	40	5	10	5	10	5	20	5	20	5	20	5	20	5	20			
18-Jan-08	0	5	0	2	4	8.5	2	0	5	5	0	0	0	0	3	3	3	3	0	0	0	4	40	9	7	15	3	0	0	0	0	0	0	0	0	0			
19-Jan-08	0	10	20	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
20-Jan-08	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
21-Jan-08	280	140	210	235	247	250	214.5	168	202	275	175	166	90	177	81	205	174	238	73	141	95	266.5	330	321	279	271	134	375	334	122	122	122	122	122	122				
22-Jan-08	1	15	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0			
23-Jan-08	3	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
24-Jan-08	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25-Jan-08	4	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26-Jan-08	2	0	10	3	5	40.5	4	42	45	40	0	3	0	5	12	4	0	2	5	28	25	20	40	2	20	3.5	0	10	3	10	3	10	3	10	3	10	3	10	
27-Jan-08	10	5	0	21	35	40.5	4	42	45	40	0	23	0	10	10	16	8	4	45	10	3	30	20	0	1	13	20.5	10	30	30	12	30	30	12	30	30	12	30	
28-Jan-08	15	15	5	22	8	0	22	28	18	5	45	13	0	10	10	16	8	6	14	18	40	17	0	2	14	15	15	10	40	10	0	10	0	10	0	10	0	10	
29-Jan-08	20	25	0	12	23	25	24	0	17	0	0	0	0	0	11	8	10	21	10	28	75	25	0	0	0	3	7	7	10	12	0	7	10	12	0	7	10	12	0
30-Jan-08	0	30	0	13	17	0	0	0	17	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
31-Jan-08	54	135	25	71	88	65.5	88	68	90	31	81	63	0	54	67	63	44	96	39	85	240	105	100	83	110	50	48	95	65	42	42	42	42	42	42	42	42		
01-Feb-08	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02-Feb-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03-Feb-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04-Feb-08	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05-Feb-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06-Feb-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07-Feb-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08-Feb-08	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09-Feb-08	2	30	20	0	8	0	5	40	11	15	0	13	0	17	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10-Feb-08	2	30	20	0	8	0	5	40	11	15	0	13	0	17	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11-Feb-08	15	25	40	26	39	105	16	56	11	20	0	16	3	38	11	23	9	13	10	42	30	30	70																





Appendix 40. Short and long-term rainfall records as recorded at KARI, National Range Research Centre, Kiboko, Makindu, Makueni District, Kenya, 1997.

YEAR	DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1996	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
	3	0.0	0.0	0.0	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	7	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8	0.0	0.0	0.0	13.0	0.0	0.0	1.3	0.0	0.0	0.0	1.0	0.0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	0.0
	12	0.0	0.0	25.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0
	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0
	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	17	0.0	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	18	0.0	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	19	0.5	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0
	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.5	0.0
	21	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0
	22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	23	0.0	0.0	9.7	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	24	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	12.2	0.0
	25	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.5	0.0
	28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
	29	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	30	47.2	0.0	24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0
	31	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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 \*  
 \* AGRONET SECTION NRRC, KIBOKO \*  
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Appendix 40. Cont'd.

YEAR	DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1997	1	0.0	0.0	0.0	2.5	0.0	0.0	2.0	0.0	0.0	0.0	0.0	5.1
	2	0.0	0.0	0.0	0.0	2.5	0.0	3.0	0.0	0.0	0.0	0.0	11.2
	3	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	9.1
	4	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	7.5
	5	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	11.3	7.7
	6	0.0	0.0	0.0	17.5	8.0	0.0	4.0	0.0	0.0	0.0	5.5	2.0
	7	1.4	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8	1.6
	8	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.6	24.0	22.7
	9	0.0	0.0	0.0	56.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.5
	10	0.0	0.0	0.0	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
	12	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	4.8	14.7	2.1
	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	6.7
	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	16.0
	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	1.0
	17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7
	18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	19	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	36.0
	21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	7.0
	22	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.5	20.0	3.8
	23	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	2.2	0.0
	24	0.0	0.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	25	0.0	0.0	0.0	19.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.6
	26	0.0	0.0	0.0	45.5	10.5	0.0	0.0	0.0	0.0	0.0	0.0	13.0
	27	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	25.0	5.7
	28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.0	21.0
	29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	18.5
	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	3.1
	31	0.0	0.0	14.2	17.5	0.0	0.0	0.0	0.0	0.0	4.5	8.4	0.0

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 \* AGROMET SECTION NRRC, KIBOKO \*  
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Appendix 40. Cont'd.

YEAR	DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1998	1	0.0	0.0	0.0	0.0	1.3	6.0	0.0	0.0	0.0	0.0	0.0	8.5
	2	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
	3	4.1	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4	43.0	0.0	0.0	22.0	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5	14.0	0.0	0.0	1.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
	6	39.5	0.0	0.0	67.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	7	42.7	0.0	0.0	13.7	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8	15.0	0.0	0.0	0.0	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	9	5.5	0.0	0.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0	0.0
	10	19.0	11.4	0.0	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	30.5	8.5	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	12	55.0	40.0	0.0	5.5	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	13	13.0	8.5	5.5	16.5	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	14	58.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15	0.0	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	16	4.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	17	9.5	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	19	3.5	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	21	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	22	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	23	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	24	0.0	0.0	11.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	25	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	26	13.3	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	12.0	0.0
	27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	28	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	29	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	30	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	31	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0

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 \*  
 \* AGROMET SECTION NRRC, KIBOKO \*  
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Appendix 40. Cont'd.

Long-Term rainfall data for NRRC Kiboko (Met Site)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1987	17	0	29.8	69.5	40.7	13.4	0.9	4.8	0	0	100.4	17.9	254.4
1988	41.3	9.3	201.2	83.6	5	9.5	0.3	2.3	2.5	0	117.5	130.2	602.7
1989	108.5	0	37.6	169.4	74.7	2.2	0	0	1.5	113.5	170.1	206.1	683.6
1990	85.6	100.4	165.4	120.8	25.2	0	0	0	0.4	0	135.8	102.3	735.9
1991	14.1	0	44.7	45.7	59.6	1.2	1	13.6	0.8	1.1	119.6	75.3	377.2
1992	0.4	0	10.5	150.4	83	0	0	0	0	128.7	172.3	176.7	722
1993	237.2	58.4	1.5	8.6	6	3.5	0	2	0	0.3	108.5	77.8	497.2
1994	1.2	30.1	104.6	8.6	7.8	0	0	0	0	23.3	217.5	200	593.1
1995	0.9	96.7	74.2	58	1.7	0	0	1.5	0	22.4	108.8	61.3	465.5
1996	96.4	57.4	62	27.5	17.6	0.4	1.3	0	0	0	187.2	7.2	457.2
1997	1.4	0	14.2	235.3	48.4	0	20	0	0	24.7	236.1	226.4	756.5
1998	442.6	99.8	30.4	153.3	102.3	12.2	1.7	0	2.4	0	21	29.7	855.4

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 \* AGROMET SECTION NRRC, KIBOKO \*  
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Appendix 41. A Typical Long Rain Recording Sheet, Muuni Settlement Scheme, Makueni District, Kenya, 1997.

CODE 22.  
**diplex** LIMITED  
 P.O. Box 172 - Westford  
 Here - WD1 1BX.

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**RAINFALL CHART**  
 YEAR 1997

Kept by Gregory M. S. Nzomo Muoli At Wimboi Village  
 Time of Observation 7:00 am County Muuni Block 3

Date	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Inches	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	mm
	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.														
1						0	0	0	0	0	9	5½	9													225
2						0	0	0	0	0	0	23														
3						0	0	0	0	0	1	21														
4						0	0	0	0	0	1	3														
5						0	0	0	0	0	11	15														200
6						0	0	0	0	0	6	15														
7						0	0	0	0	0	5½	3														
8						0	0	0	0	0	25	4														175
9						0	0	0	0	0	0	2														
10						0	0	0	0	3½	0	1½														
11						0	0	0	0	0	0	0														150
12						0	0	0	0	0	15	39														
13						0	0	0	0	0	4	3														
14					0	0	0	0	0	0	2	17½														
15					0	0	0	0	0	0	2½	21														125
16					0	0	0	0	0	0	27½	13														
17					0	0	0	0	0	10	12	3														
18					0	0	0	0	0	5	1	7½														100
19					0	0	0	0	0	0	7	30														
20					0	0	0	0	0	0	0	1½														
21					0	0	0	0	0	0	20½	15														75
22					6	0	0	0	0	0	4	0														
23					10	0	0	0	0	0	0	0														
24					5	0	0	0	0	0	0	2														
25					2	0	0	0	0	0	0	14														50
26					0	0	0	0	0	0	13	15														
27					0	0	0	0	0	0	21	50														
28					0	0	0	0	0	0	7½	3½														25
29					0	0	0	0	0	0	8	15	26													
30					0	2½	0	0	0	0	6	31	0													
31					0	0	0	0	0	0		0														
<b>MONTHLY TOTALS</b>					23	2½	0	0	0	32½																

Appendix 41b. A Typical Short Rain Recording Sheet, Muuni Settlement Scheme, Makueni District, Kenya, 1997/98.

✓ CODE 22(W)

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RAINFALL CHART

P.O. Box 172 - Westford  
Herts - WD1 1BX

YEAR 1998

Kept by Gregory Muoki At Wimboo Village  
Time of Observation 7.00 am County Muramba B3

Date	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Inches	mm											
	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.	in. or mm.		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	20	0	0	0	0								9												225
2	0	0	0	0	0																				
3	15	0	0	0	0																				
4	35	0	0	64	0																				
5	40	0	0	0	2																				
6	50	0	0	0	9																				
7	20	0	0	0	12½																				
8	37	0	0	0	0																				
9	25	0	4	0	0																				
10	15	3	0	36	46																				
11	74	30	0	0	7																				
12	49	45	0	45½	10																				
13	15	13	0	13½	0																				
14	55	0	0	0	0																				
15	0	12½	0	0	0																				
16	63	0	0	0	0																				
17	3	6½	0	0	0																				
18	4	0	0	0	0																				
19	3½	3	0	0	0																				
20	0	0	0	0	0																				
21	0	0	0	0	0																				
22	0	0	9½	0	0																				
23	0	0	3	0	0																				
24	0	0	0	0½	0																				
25	0	0	5	0	0																				
26	27	0	7	0	0																				
27	20	0	0	2																					
28	17	0	6	3																					
29	25	0	0																						
30	14		0	0																					
31	0		0																						
													MONTHLY TOTALS ✓												