



**Kenya Agricultural Research Institute  
National Agricultural Research Laboratories**

**P.O. Box 14733, Tel: 444140 – 44, 444029 – 32, 444250 - 56**

**Fax No: (+254) – 2 - 444144**

**NAIROBI**

# **Using Farmer Field Schools Approaches to Overcome Land Degradation in Agro-Pastoral Areas of Kenya**

***Final Workshop Report Held at Ndallas Hotel,  
Matuu on 14-17<sup>th</sup> May 2007.***

**By**

**Gachimbi, L.N., Kamoni, P.T Gicheru, P.T., Obanyi,  
S and Macharia, P.N.**

**6<sup>th</sup> September, 2007**

## Table of Content

<b>1.0</b>	<b>Agro-Pastoral Farmer Field Schools Project Objectives by <i>Louis N. Gachimbi</i>.....</b>	<b>1</b>
<b>2.0</b>	<b>Official Opening by A.O. Esmail.....</b>	<b>2</b>
<b>3.0</b>	<b>Using Farmer Field Schools Approaches To Overcome Land Degradation in Agro-Pastoral Areas of Kenya <i>Progress Report by T.K. Mutinda</i> .....</b>	<b>3</b>
<b>4.0</b>	<b>Introduction to Land Degradation Assessment, Indicators and Monitoring Methods by <i>P. T. Gicheru and L. N. Gachimbi</i>.....</b>	<b>6</b>
4.1	<i>Land degradation manifests itself in multiple ways including:.....</i>	6
4.2	<i>Land degradation type indicators and methodologies for assessment.....</i>	7
4.3	<i>Analysis of sustainability of farming systems.....</i>	9
<b>5.0</b>	<b>Root Cause Analysis of Land Degradation, Threats/Barriers to Sustainable Land Management in Agro-Pastoral Farmer Field Schools Areas by <i>Louis N. Gachimbi</i> .....</b>	<b>10</b>
5.1	<i>Causes and mitigation strategies of land degradation in the asal areas .....</i>	10
5.2	<i>Biophysical causes of land degradation.....</i>	10
5.3	<i>Socio-economic causes of land degradation.....</i>	11
5.4	<i>Barriers to adoption of Sustainable land management practices .....</i>	13
5.5	<i>Driving forces, Pressures, State, Impact, Response Framework.....</i>	13
5.5.1	<i>Globalisation.....</i>	14
5.5.2	<i>National policies concerning land tenure and access to land .....</i>	14
5.5.3	<i>Civil strife and insecurity.....</i>	15
5.5.4	<i>Income diversification and urbanisation .....</i>	15
5.5.5	<i>Gender roles and labour allocation.....</i>	15
5.5.6	<i>The role of poverty and wealth — land use and management relationship .....</i>	15
5.6	<i>Stakeholders perception of Driving forces, Pressure, State, Impact, Responses and Threats to sustainable land management in Mwingi and Mbeere districts (Group reports).....</i>	17
<b>6.0</b>	<b>Agropastoralism Farming Systems, Challenges, Copping Strategies, Opportunities and Best Management Practices by <i>L.N. Gachimbi</i>.....</b>	<b>21</b>
6.1	<i>Introduction .....</i>	21
6.2	<i>Farming systems in ASAL according to De Jager et al 2005 and Gachimbi et al 2006 ....</i>	21
6.3	<i>Mbeere District Farming system challenges, causes, copping mechanisms and opportunities: The case study of Kirie location.....</i>	23
6.4	<i>Stakeholders perception of problems, Causes, Copping mechanism and Opportunties in Mwingi Nad Mbeere Districts.....</i>	26
<b>7.0</b>	<b>Agropastroral FFs Land Degradation Curriculum Development by <i>Stella Obanyi and L. N. Gachimbi</i>.....</b>	<b>30</b>
7.1	<i>Purpose of the curriculum .....</i>	30
7.2	<i>Stakeholders perception of Agropastoral FFs curriculum development .....</i>	31
<b>8.0</b>	<b>Introduction to Participatory Monitoring and Evaluation for Agro-Pastoral Farmer Field Schools Project by <i>L. N. Gachimbi and P.T.Gicheru</i> .....</b>	<b>35</b>
8.1	<i>Why participatory monitoring and evaluation.....</i>	35
8.2	<i>The Logical Framework.....</i>	35
8.3	<i>Structure and contents of logical framework.....</i>	36
8.4	<i>Verifiable indicators .....</i>	38
8.5	<i>Assumptions .....</i>	39
8.6	<i>Harmonised master (Interlocking) Logframe for using farmer field schools approaches to overcome land degradation in agro- pastoral areas of Kenya .....</i>	41
8.6.1	<i>Logical Framework for Building Capacity for Sustainable Land Management.....</i>	43
8.6.2	<i>Logical Framework for Strengthening the Enabling Environment for Sustainable Land Management.....</i>	46

8.6.3	<i>Logical Framework for Project Coordination, Monitoring and Evaluation</i> .....	49
<b>9.0</b>	<b>Closing Remarks</b> .....	<b>52</b>
<b>10.0</b>	<b>Annexes</b> .....	<b>52</b>
10.1	<i>Land Degradation Terms of Reference</i> .....	52
10.2	<i>Workshop Program</i> .....	57
10.3	<i>List of Participants</i> .....	59

## **Summary**

The overall project goal is to identify and remove policy, technical and capacity-related barriers currently impeding the sustainable Land management. The project will build on extensive FAO FFS experiences and adapt it in the context of agro-pastoral systems. The FFS approach has proved highly successful in addressing the needs of local communities and facilitating improved management of natural resources. However, the current FFS program in Kenya does not have a focus in agro-pastoral areas but is restricted to medium and high potential areas. The promotion of agro-pastoral innovations, demand driven community experimentation and community-based experiential learning in agro-pastoralism will allow ASAL communities to discover sustainable interventions about their livelihoods and wise use of resources, whilst addressing food security, enhanced knowledge and income generation.

A three-day stakeholders workshop was held in Matuu Ndallas hotel from 14<sup>th</sup> to 17<sup>th</sup> May 2007. The main objective of the workshop was identification of root cause analysis of land degradation problem in the agro pastoral areas using driving forces, pressures, impact and response model, barriers and threats to adoption of sustainable land management practices. Land degradation indicators and methods of measurement in the pilot districts were also discussed and identified. Others outputs of the workshops were a draft log frame for the project and a draft curriculum for Mwingi and Mbeere Districts AgFFS. KARI organized the workshop in collaboration with FAO, Ministry of Agriculture (MOA) and ministry of livestock development and Fisheries (MoLDF) from the HQTS and from Mbeere and Mwingi Districts. It was attended by a total of 30 participants from NEMA, Kenya Forest Service MoA, MoLDF, Social Services Department, KARI, Arid Lands Programme, farmers and NGOs

## **1.0 Agro-Pastoral Farmer Field Schools Project Objectives by *Louis N. Gachimbi***

The overall project goal of Using Farmer Field Schools (FFS) Approaches to Overcome Land Degradation in Agro-pastoral Areas of Kenya is to identify and remove policy, technical and capacity-related barriers currently impeding the sustainable Land management. The project will build on extensive FAO FFS experiences and adapt it in the context of agro-pastoral systems. The FFS approach has proved highly successful in addressing the needs of local communities and facilitating improved management of natural resources. However, the current FFS program in Kenya does not have a focus in agro-pastoral areas but is restricted to medium and high potential areas. The promotion of agro-pastoral innovations, demand driven community experimentation and community-based experiential learning in agro-pastoralism will allow ASAL communities to discover sustainable interventions about their livelihoods and wise use of resources, whilst addressing food security, enhanced knowledge and income generation.

KARI in this project was subcontracted to collect baseline information on land degradation assessments in Mbeere, Mwingi and Narok Districts under UINTS/KEN/001/GEF Project. The ToR of the tasks is spelt out in section 10.

### **The main objectives of the workshop were to:**

- A. Carry out analyses of threats, root causes and barriers to overcome land degradation through adoption of sustainable land management practices in Agro-pastoral areas
  - Develop a draft log frame showing project intervention logic based on problem tree analysis of driving forces, pressures, state, impact and response framework
  - Write report, circulate, react to comments and finalize the report.
- B. Development of land degradation M&E methodological framework (toolkit development)
  - Develop indicators, methods and tools for assessment of land degradation, status from both biophysical and socio economic point of view.
  - Develop a methodological framework (M&E toolkit) for measuring land degradation including list of indicators, their causes and possible mitigation strategies for land degradation and livelihoods.
- C. The outputs of these activities would be:
  - Refined analysis of threats, root causes of land degradation coping strategies, opportunities and barriers to adoption of sustainable land management practices;
  - Draft log frame (intervention narrative, indicators, means of verification and risks and assumptions)
  - Defined indicators, methods and tools for assessment of land degradation status from both biophysical and socio economic point of view.
  - Defined curriculum for the AgPFFS
  - Workshop report.

## **2.0 Official Opening: A.O. Esmail, Ministry of Livestock Development and Fisheries**

A.O. Esmail (*Deputy Director, livestock Development*) presided over the opening. He welcomed all the participants to the workshop and stressed the importance of the workshop to both ministries. He noted that both the Ministry of Agriculture and Livestock development and Fisheries have come together with support from FAO to implement a pilot Agro-pastoral FFS project to address the serious problem of land degradation. He further observed that the project was in line with Ministry of Agriculture Strategy for Revitalisation of Agriculture (SRA) and the proposed national Extension Policy (NASEP). He observed that the agro-pastoral areas have been under great pressure from population and un-coordinated development activities that have led to land degradation. He informed participants the Ministry of Livestock and Fisheries Development was also developing a policy on ASAL to address these crosscutting development issues.

He lastly wished the participants a nice stay and fruitful deliberations in order to produce a good document addressing their land degradations concerns and appropriate coping strategies /opportunities.

### 3.0 Using Farmer Field Schools Approaches To Overcome Land Degradation in Agro-Pastoral Areas of Kenya *Progress report by T.K. Mutinda, FAO-KE*

- Recognising the need for urgent involvement of the country's ASALs to achieve sustained growth
- Holistic and cross -sectoral development approach
- Land degradation in ASAL
- FFS recognised by partners as a new and potential method for ASAL development



**Figure 1: Kenya Arid and Semi Arid Lands**

#### **Project Objectives**

**Development objective:** To **increase** uptake of sustainable land use management practices by agro-pastoral communities in order to reduce land degradation in the ASALs of Kenya and promote sustainable development and enhanced livelihoods.

#### **Immediate Objective:**

To remove capacity related barriers impeding the adoption of Sustainable land management (SLM) practices through community actions and dissemination of innovations and SLM practises through FFS

**The preparatory process involved preparing the PDF B document:**

- Detailing Capacity building Actions of the Full Scale Project
- Explaining the Development of necessary tools for extending FFS work to drylands by piloting and testing
- Identifying appropriate Interventions for halting degradation processes and restoring ecosystem integrity
- Identify stakeholders and facilitate multi-sectoral involvement and collaboration strategies

**Training of Facilitators.**

21 Facilitators from Mwingi, Mbeere and Narok districts have been trained. The objectives of the training was to:

- To build the capacity of FFS facilitators in technical areas related to agro-pastoral land management.
- To adapt FFS approaches for agro-pastoral systems
- To develop strategies for livelihood risk management in ASAL areas
- To create linkages and networking among FFS facilitators.

A reconnaissance visit to the districts was also made and the following observations were made:

- The GEF land degradation project is in line with the government policy and strategies (Strategy for revitalising agriculture, Food Security, Arid and semi arid lands)
- Choice of the pilot districts was considered appropriate due to expanding land degradation
- The lessons learned in FFS activities in the pilot districts have shown that FFS approach enhances farmer participation/ involvement in decision making
- Technical officers in the Ministry of Livestock and Fisheries Development are new to FFS approach
- Limitation of field officers and the few available are overstretched with ongoing programmes
- There are opportunities of linking up the project with ongoing programmes in the pilot districts

**Ground Working accomplished so far (FFS established)**

District	APFFS	Members	Division
Mwingi	Italic	33	Seizure
	Vatic	34	Ngomeni
	Kaikungu	39	Migwani
Mbeere	Rukira kwirutira	31	Siakago
	Ngiiori	30	Gachoka
	Kathinthiuku	35	Siakago
Narok	Chemorut	49	Mulot
	Katakala		Central
	Nkilorit		East Mau

**FFS backstopping being carried out by the following:**

Consultant	TOR
Agro-Pastoral Land Use Innovations	Coordinate the identification, recruitment, verification, and characterization of agro-pastoral land use innovations
FFS Master Trainers (2)	Coordination, backstopping & supervision of FFS related activities
FFS Curriculum Development	Technical backstopping to the agro-pastoral FFS implementation and curriculum trial set-up.

**Baseline Studies being carried out**

Contract	Partner
District Profiles	ILRI
Land degradation assessment and Toolkit development	KARI-KSS DRSRS ICRAF
Policy assessment and review of existing decision making tools	ICRISAT
Development of Training Materials for Agro-pastoral Systems	AHI / Land care



**Participatory development of GEF FSP is being carried by:**

No	Activity	Partners	Time
1.	Baseline studies	KARI/DRSRS/ ICRAF	April July
2.	Development and testing of agro-pastoral FFS	Moa/MoLDF/ APFFS	April - October
3.	UNDP/FAO resource mobilization meeting	GoK / UNDP /FAO / NGOs	May 8
4.	Project Identification Form (PIF) submission	UNDP/FAO	June
5	FSP Consultant	UNDP/FAO	August
6	District workshops	GoK/ FAO	Mid August
7	TAC review	GoK/FAO	September
8.	National stakeholder workshops	GoK / FAO	September
9	Project steering committee meeting (PSC)	PSC	October
10	Project formulation process	PSC	Sept-Nov

**4.0 Introduction to Land Degradation Assessment, Indicators and Monitoring Methods by *P. T. Gicheru and L. N. Gachimbi***

About 70 percent of Kenya's population live in 12 percent of total land area (581,679 square kilometres) which is classified as being of medium to high potential for agriculture and livestock production while the other population live in the ASALS. The growing population and the resulting increase in demand for land, energy and water is putting tremendous pressure on the natural resources leading to land degradation.

**4.1 Land degradation manifests itself in multiple ways including:**

- Over-exploitation and poor use of the natural resource base;
- Excessive soil erosion, gullyng and increased sediment loading of water bodies;
- Nutrient depletion due to burning of biomass, continuous cultivation etc.
- Reduced ground cover and lower carrying capacity of pastures in ASAL areas
- Continued loss and degradation of forest areas as well as clearing of farm forestry i.e. loss of biodiversity.
- Reduced flows of water, drying up of water rivers/springs, worsening water quality. In terms of increased sediments load and dissolved chemicals/agrochemicals.
- Habitat loss and threats to biodiversity

- Increased damages from cycle of droughts and floods as well as increased degree and frequency of such extreme events are a common occurrence in Kenya.
- Increased vulnerability of and gradual reduction in incomes of rural families especially in ASALs.

#### 4.2 Land degradation type indicators and methodologies for assessment

Land degradation takes different types and has a variety of indicators and methodologies for assessment as shown in table below.

- Soil erosion indicators
- Vegetation indicators
- Water resources indicators
- Fuel wood indicators
- Socio economic indicators
- Climatologically indicators
- Wind erosion indicators

#### Type of land degradation, Indicators and monitoring methods

1. Soil degradation	Indicator	Method of monitoring
a) Soil erosion by water leading to a reduction in soil depth and loss of plant nutrients	Rills, gullies, reduced soil depth, stunted crops, reduced crop yield	Field assessment, sampling and laboratory analysis
b) Nutrient output exceeding input	Reduced crop yield, stunted crop growth	Soil sampling for analysis in the laboratories, nutrient budgeting
c) Acidification	Stunted crop growth,	Soil sampling and laboratory soil analysis
d) Physical deterioration e.g. crusting, soil sealing	Soil capping	Field surveys or observation
e) Water logging	Yellowing of crops, stunted growth, stagnant water or invasive weeds	Field assessment
f) Salinity/sodicity	Salty soil surface (white), slumping and soil particle flocculation	Soil sampling and analysis for sodium and salt levels. Field salt assessment
g) Sediment deposition	Deposited soil, covered crops/vegetation, exposed roots	Field assessments for soil deposits/exposed roots
h) Low soil fertility	Stunted crops and reduced yields, yellowing, purpling due to Nitrogen and phosphorous deficiency symptoms	Soil sampling and analysis for N, P, K and C and others micro-elements

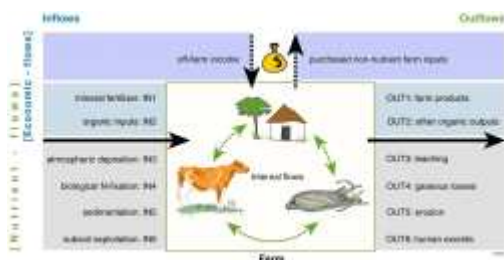
<b>2. Vegetation degradation</b>	<b>Indicator</b>	<b>Monitoring methodology</b>
a) Forest clearing and uncontrolled logging.	Open grounds, exposed stumps or roots	Vegetation surveys on species composition, canopy cover and species abundance and satellite imagery on exposed areas
b) Selective cutting for fuel wood or charcoal and loss of canopy cover	Open grounds, exposed stumps	Vegetation surveys on species composition, canopy cover and species abundance, satellite imagery on exposed area
c) Invasion of unwanted species	Bush encroachment	Vegetation surveys on species composition, canopy cover and species abundance, satellite imagery on exposed area
d) Loss of ground cover	Bare ground, soil erosion	Vegetation surveys on species composition, canopy cover and species abundance, satellite imagery on exposed area

<b>3. Water degradation</b>	<b>Indicators</b>	<b>Monitoring methodology</b>
a) Sedimentation	Sediment load in rivers, silt deposition in plains/farms	Field surveys, water sampling for laboratory analysis and river gauging for sediment load
b) Pollution	Toxic elements in water	Field surveys, water sampling for toxic elements quality analysis
c) Drying of springs and wells	Reduced water table, reduced stream flow	Field surveys, water sampling for laboratory analysis, river gauging
d) Boreholes and shallow wells	Reduced discharge and water table	Field surveys, water sampling for laboratory analysis, river gauging, bore hole and wells

4. Other types of land degradation	Indicators	Method of monitoring
Socio-economic	Human population density, distribution of livestock, wildlife and human settlements, income distribution, absolute poverty, nutrition levels, agricultural productions	Socio-economic baselines surveys
Fuel wood	Supply and demand of fuels	Vegetation surveys
Climatological	<ul style="list-style-type: none"> <li>• Rainfall frequency, amount and distribution, probability of drought</li> <li>• Temperature ranges</li> <li>• Wind erosivity indexes</li> </ul>	Actual measurements

### 4.3 Analysis of sustainability of farming systems

Agricultural, economical and environmental performance of land use systems could be assessed using NUTMON tool. The tool conceptualize a farm as a black box where nutrients goes to the farm inform of seeds, fertilizer (organic and inorganic etc) while others leave the farm through crop harvest (grain and stover), erosion, leaching, volatilization etc. The output is usually economic (farm incomes etc) or biophysical parameters e.g. N, P or K (balances at farm or catchments level has caused imbalances at farm level).



- Quantification of nutrient in and out, analysis and reporting is done by carrying out direct farm measurement and use of transfer functions in the NUTMON toolbox.

## **5.0 Root Cause Analysis of Land Degradation, Threats/Barriers to Sustainable Land Management in Agro-Pastoral Farmer Field Schools Areas by *Louis N. Gachimbi***

### **5.1 Causes and mitigation strategies of land degradation in the alas areas**

Causes of land degradation can be considered fewer than two headings, the proximal causes and the root causes. The proximal causes are those that are immediately obvious. For example, a hillside is under cultivation for maize but there are signs of serious erosion. The immediate causes can be identified as steep slopes and lack of any conservation measures such as trash lines, grass strips, stone bunds or terraces. However, the root causes may be a complex web of social, economic and political problems that have discouraged or prevented the farmer from taking the necessary action. The proximal causes are mainly biophysical in nature whereas the root causes are predominantly socio-economic and political. The following are the most important causes of land degradation in Kenya and in particular ASAL areas.

### **5.2 Biophysical causes of land degradation**

- *High intensity tropical rain.* It is recognized that the annual rainfall that falls is usually low 300-700 mm per year but its amount and distribution per year is poor and of high intensity This is why maintaining ground cover of growing pastures or crop residues must be a number one priority in all cases to prevent erosion.
- *Steep slopes.* The rate of soil erosion on bare cultivated land is roughly proportional to the square of the slope. Due to population pressure farmers have settled on steep slopes. Some land in Mbeere is being cropped at over 50% slope. With increasing population, this situation is not likely to change but much can be done by promoting forms of land use that keep the ground covered, e.g. pasture and fruit trees and properly maintained terraces.
- *Long slopes.* Long slopes without any barriers to intercept runoff experience severe erosion. This is especially noticeable in both districts of Mbeere and Mwingi. This problem can be overcome by use of contour vegetative barriers and/or terraces.
- *Highly erodible soils.* Soils of the Basement complex are common in our study districts. More care in conservation is needed on the more erodible soils to include terracing, mulching and addition of organic matter to improve stability.
- *Nutrient depletion, slow crop growth and poor ground cover.* The decline in fertility due to continuous cropping without rest periods leads to poor crop growth and lack of cover during the early part of the rainy season when the most intensive (erosive) rains are expected.

- *Annual cropping and predominance of cereals.* Annual cropping means that land is exposed once a year, or twice a year in areas with two rainy seasons, to intense rainfall. Maize is the predominant crop and takes at least a month before it forms a reasonable cover and protection of the ground. If beans or cowpeas/green grams are inter-planted, ground cover develops faster. A change in cropping system from a pure stand of maize, where possible, plus the application of conservation measures are needed to stabilize the situation.
- *Failure of conservation measures.* Conservation measures such as cutoff drains, retention ditches and terraces have an important role to play on steep slopes. But if they are not maintained as is the case in some farms, they can actually aggravate the problem of soil erosion. Maintenance is essential.
- *Discharge from road drains onto agricultural land without proper disposal arrangements.* This is a major problem that has caused severe degradation in farms. On major roads, engineers and contractors are now required to make proper provision for the safe disposal of runoff onto grassed areas or through lined waterways to natural watercourses. But on minor roads this is often neglected. Many gullies have been caused in this way and the cost of reclamation is high. Application of environmental legislation should be used where communities are unable to agree on control measures.
- *Overstocking and overgrazing of pastures.* This problem is more common in areas of communal grazing than in areas where land has been demarcated as individual holdings. There are many approaches to solving this problem. Improvements in disease control and marketing to encourage farmer sell his stock are important and the re-establishment of the Kenya Meat Commission will go some way to solving the problem. Improvements in water distribution by means of pans and dams to reduce grazing pressure around permanent water points is also important. Procedures need to be developed to restore cover quickly to denuded land by promoting infiltration of rainwater and establishment of grasses.
- *Livestock and human trekking to water.* Stock tracks and footpaths that are difficult to avoid cause gullies. The ideal solution is to provide piped water to homesteads. Where this is not possible, rainwater harvesting from roofs, roads and compounds can reduce the need for trekking.
- *Drought.* Severe drought after every five years in Kenya and after every two years in ASALs causes loss of ground cover. Even if livestock are removed from grazing land, termites continue to deplete the ground cover. If heavy rains come early in the season when the ground is still bare erosion will occur as is common in all the target areas. There is no simple solution except to diversify the economy in areas that are prone to drought.

### **5.3 Socio-economic causes of land degradation**

- *Poverty, low incomes and lack of resources of labour, capital, tools, equipment, materials, etc.* Most farmers in ASALs have low farm incomes due to low crop productivity; low marketable products and more than 60% of the inhabitants live below poverty line. Labour is also scarce and capital is low due to lack of credit to purchase farm tools and farm inputs. This is reported in various PRA reports carried out in the two

districts. Education and income diversification will gradually lead to more effective management of the land resources.

- *Small holding sizes, lack of resting/fallowing.* Increasing population in high potential areas and natural population growth has had two major consequences: the decrease in holding size and the movement of people into formerly uncultivated areas. People have moved into lands of lower potential or of steep slopes or marginal rainfall, as is the case in Mbeere District. Such people have had difficulty generating the income needed to maintain the soil capital. The decrease in land holding size with the growth of population has reduced the opportunities for resting or fallowing land under a restorative crop in the study districts. Many holdings no longer have cattle and may have little or no manure to use for fertility maintenance. The development of innovative ways of making manure e.g. composting is important.
- *Lack of secure tenure.* Although there has been a major effort, in high potential areas, to establish individual as opposed to communal land ownership through demarcation and registration of holdings, some areas where this has not been done and land users lack the security needed to make long term investments of labour or capital in land improvements need to be hastened.
- *Lack of knowledge on what can be done and how to do it and aversion to taking risks.* Although some farmers have shown what can be done by individual efforts to control erosion and reverse degradation in many of the catchments, there is still inadequate knowledge of what should be done. This applies particularly to problems of soil fertility that are less well understood. The new policies and approaches for agricultural and livestock extension should have important role to play.
- *Failure of government to implement basic land usage policies.* There are regulations that allow government officers to prevent mismanagement of land. These rules can be used to protect steep slopes and valley bottoms in all catchments. Government can have a major impact on land degradation by adopting and implementing appropriate policies or by failing to do so. Lack of clear policies on land use has led to conflicts in several parts of the country and conflict has exacerbated the problems of land degradation. An example of this is the conflict between cultivators and pastoralists in some districts in Kenya.
- *Poor infrastructure and lack of access to markets.* On top of these basic causes of land degradation, there is a common complaint of poor markets for produce. Either, prices have been too low, e.g. due to competition from imported foodstuffs, or the costs of inputs such as fertilizer has been too high, or access to markets has been poor on account of badly maintained roads and poor communications as in the case in Mbeere and Mwingi districts as reported in various PRA reports. Prices offered by traders have offered little incentive and the returns have not been adequate to meet the needs for additional inputs. The Constituency Development Funds that are now provided by the government are already leading to improvements in rural roads but are subject to misuse unless properly monitored and controlled.
- *Sickness.* Malaria, TB and HIV/AIDS continue to ravage the health of many in rural as well as urban areas and this has affected adoption of SLM practices.
- *Insecurity.* Many parts of ASALs suffer from general insecurity due to theft, thuggery, cattle raiding, etc. This has discouraged investment in land improvements such as tree planting, gully control, water harvesting and pasture establishment.

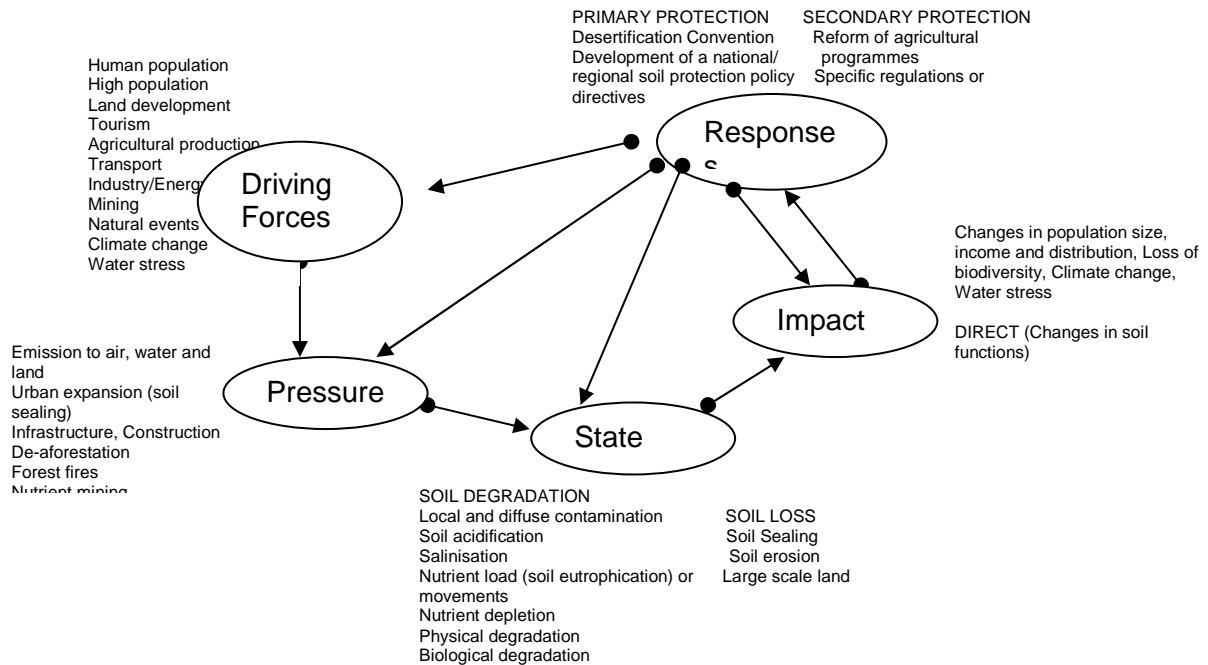
#### **5.4 Barriers to adoption of Sustainable land management practices**

- Increased damages from cycle of droughts and floods as well as increased degree and frequency of such extreme events
- Increased vulnerability of and gradual reduction in incomes of rural families;
- Inadequate investments in agriculture and weak extension systems
- Weaknesses of research programs (targeting, applicability, cost effectiveness, demand driven etc)
- Inappropriate and unsustainable agricultural practices such as cultivation on steep slopes, in marginal areas etc
- Overgrazing, and loss/degradation of vegetation;
- Untenable traditional land management practices – such as fallowing to restore fertility – due to high population density and fragmentation;
- Inappropriate land use and protection in the country's catchment areas;
- Unclear property rights (tenure) implying lower investments in sound land and natural resources management;
- Absence of alternate livelihood opportunities;
- Increased demand for wood-fuel and charcoal and high prices for charcoal in an active commercial market;
- Deficiencies in the policy framework including barriers to adoption of and investment in, sustainable land management technologies;
- Weakness in the legislative and legal framework, in particular lack of cross-sectoral coordination on land management (NRM is covered under 77 different statutes that are limited to a specific sectoral or functional focus);
- Absence of regular and accurate assessments and monitoring of natural resources combined with the lack of capacity to analyze and develop decision support information systems;
- Insufficient mechanisms to address environmental externalities and lack of incentive structures to promote environmental management (such as, payments for environmental services);
- Social issues including inheritance and burial practices;
- Lack of awareness among the groups contributing to the degradation regarding the impacts of their actions; and
- Lack of champions for sustainable land management (a reflection of its cross-sectoral nature)

#### **5.5 Driving forces, Pressures, State, Impact, Response Framework**

Figure 2 shows DPSIR framework as applied to soil related impacts (Blum 2004)





**Figure 2: DPSIR framework by (Blum 2004)**

### 5.5.1 Globalisation.

- Rapidly changing international and national markets for a variety of agricultural and industrial commodities, and changing national access to international markets,
- Increased competition between and within countries among those producing the globally marketed commodities, resulting in variable and often declining producer prices,
- Economic diversification as people respond to new opportunities, and
- International influences on national policies and regulations, for example concerning type and quality of products exported and source of inputs (e.g., source of cotton grown in Mbeere and Mwingi used in textile industry).

### 5.5.2 National policies concerning land tenure and access to land

- Gazetted, or degazetted land as protected areas (parks, reserves), or changing the regulations of how protected areas can be used;
- Altered land tenure regulations, such as the privatisation of former communal land (e.g., grazing areas), the delimitation of group ranches, or the changing of “traditional” land tenure systems that result in altered rights over land;
- Encouraged or discouraged migration through development of settlement schemes, or by allowing (or not allowing) people from other areas to have access to land or have land user rights;

- Centralization and decentralization of the management of communal land and protected areas by the government.

### **5.5.3 Civil strife and insecurity**

General insecurity or civil strife may have a major impact on sustainable land use and management, but are often considered unusual or temporary phenomena in land use and root causes analyses.

- The halting of trade in agricultural and other commodities, resulting in a focus on subsistence food production and less investment in soil management practices
- Out-migration of farmers to local urban centres and to the capital city, leaving their fields to become bush or with old people who cannot manage land efficiently
- A delay in government investment in roads and other infrastructure leads to slower than expected economic growth and land use change.

### **5.5.4 Income diversification and urbanisation**

- Out migration for urban employment- or large farms
- Households in rural areas are often very engaged in earning income from non-agricultural sources. The ties with off farm activities/employment can greatly affect sustainable land management as labour is pulled from farms so cultivation is less expansive or intense, and less labour is invested in the farm including in soil management.
- It is a particularly critical strategy for poor households with tiny farms or for households in marginal environments such as in semi-arid areas, permitting them to remain farming where it otherwise might be too risky or insufficiently productive to support a family.
- The out-migration of men can lead to altered gender roles and responsibilities.
- Wealthier households with supplemental non-farm income may tend to manage their farms with a high degree of capital inputs, including the hiring-in of labour.

### **5.5.5 Gender roles and labour allocation**

Men and women have often had different roles and responsibilities in rural land use and economic systems. Who does which task is often differentiated by what type of crop it is, or whether the task is near or far from the home. High rates of male out-migration can increase work burdens and affect investment in the farm, but may not improve women's legal or traditional rights over access to land, water and other resources. Levels of wealth, farm labour availability and ability to produce commodities may vary greatly between men and women headed households. Gender and poverty often combine to greatly impact land use and land management practices. Women headed households may make significantly fewer investments due to the lack of labour and capital, and fewer farm and non-farm resources.

### **5.5.6 The role of poverty and wealth — land use and management relationship**

- The limited labour availability, cash and other resources to invest in the farm typical of poor households in ASALS directly impacts on the choice of land use (crops, fallow, trees etc.), the inputs applied and soil management techniques practiced. In many places, poverty

or wealth is closely associated with land degradation or improvement. The association of poverty and degradation, however, varies in strength between areas and over time depending on the profitability and structure of the agricultural system.

- The distribution of land between households and groups may greatly influence local land use. Wealthier households and large scale land managers generally tend to use and manage their land much less intensely—more land is under fallow, in tree crops or being used for grazing animals, for example. Their agro-diversity is often much lower than on smaller farms, but they may, depending on the system, have more native species diversity.

## 5.6 Stakeholders perception of Driving forces, Pressure, State, Impact, Responses and Threats to sustainable land management in Mwingi and Mbeere districts (Group reports).

### Results from group 1

Driving forces	Pressure	State	Impact	Responses	Threats
<ul style="list-style-type: none"> <li>• High population density</li> </ul>	<ul style="list-style-type: none"> <li>• Deforestation</li> <li>• Nutrient mining</li> <li>• Change in land use</li> <li>• Land fragmentation</li> <li>• Resource competition</li> <li>• Air pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Bare land</li> <li>• Low soil fertility</li> <li>• Reduced crop land</li> <li>• Reduced economies of scale</li> <li>• Conflict over resources</li> <li>• Pollution (diseases)</li> </ul>	<ul style="list-style-type: none"> <li>• Soil erosion</li> <li>• Low yields</li> <li>• Loss of bio-diversity</li> <li>• Food insecurity</li> <li>• Rural-urban migration</li> <li>• Low incomes and distribution</li> <li>• Increase in crime and loss of lives</li> <li>• Land abandonment as a result of clashes</li> <li>• Reduced labour as a result of out migration</li> <li>• Increased poverty</li> <li>• Climate change</li> </ul>	<ul style="list-style-type: none"> <li>• Participatory awareness creation on environmental conservation and protection</li> <li>• Appropriate agricultural technologies developed</li> <li>• Diversification of farm enterprises</li> <li>• Income generating activities</li> <li>• Conflict resolution using various methods</li> </ul>	<ul style="list-style-type: none"> <li>• Out break of diseases</li> <li>• Market change</li> <li>• Income diversification and urbanisation</li> <li>• Differential poverty and wealth</li> <li>• Gender roles and responsibilities</li> <li>• Insecurity</li> <li>• Natural calamities (floods, drought, famine)</li> </ul>
<ul style="list-style-type: none"> <li>• Water stress</li> </ul>	<ul style="list-style-type: none"> <li>• Interference of water catchment areas</li> <li>• Loss of diversity</li> <li>• Reduced watering points</li> <li>• High rainfall intensity</li> </ul>	<ul style="list-style-type: none"> <li>• Soil degradation e.g. salinisation, acidity, nutrient depletion and biological degradation</li> <li>• Drought</li> </ul>	<ul style="list-style-type: none"> <li>• Rills, gullies</li> <li>• Migration</li> <li>• Conflicts</li> <li>• Loss of biodiversity</li> <li>• Food insecurity</li> <li>• Climate change</li> <li>• Diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening reterant policies</li> <li>• Participatory awareness creation over the resources e.g. water</li> <li>• Appropriate water harvesting technologies</li> <li>• Formation of water use association</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of political good will</li> <li>• Conflicting policies</li> <li>• Political conflicts</li> <li>• Land tenure</li> <li>• Cost of technology</li> </ul>
<ul style="list-style-type: none"> <li>• Transport</li> </ul>	<ul style="list-style-type: none"> <li>• Uncontrolled</li> </ul>	<ul style="list-style-type: none"> <li>• Gullies</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of</li> </ul>	<ul style="list-style-type: none"> <li>• Participatory planning</li> </ul>	<ul style="list-style-type: none"> <li>• Labour loss</li> </ul>

	<ul style="list-style-type: none"> <li>• Run-off</li> <li>• Urbanization</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced arable lands</li> <li>• Pollutants</li> </ul>	<ul style="list-style-type: none"> <li>• agricultural lands</li> <li>• Low productivity</li> <li>• Diseases</li> <li>• Increased crime</li> <li>• Employment</li> </ul>	<ul style="list-style-type: none"> <li>• Law enforcement</li> </ul>	<ul style="list-style-type: none"> <li>• through emigration</li> <li>• Corruption “TKK”</li> <li>• Labour flight from agriculture</li> </ul>
<ul style="list-style-type: none"> <li>• Mining sand/stone</li> </ul>	<ul style="list-style-type: none"> <li>• Available agriculture/livestock land</li> </ul>	<ul style="list-style-type: none"> <li>• Abandoned sites</li> <li>• Water pools</li> <li>• Lowered water table</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced arable lands</li> <li>• Food insecurity</li> <li>• Loss of aesthetic value</li> <li>• Diseases</li> <li>• Water scarcity</li> </ul>	<ul style="list-style-type: none"> <li>• Site rehabilitation</li> <li>• Appropriate technology</li> <li>• Appropriate policies</li> <li>• Disease control programmes</li> <li>• Opportunity for irrigation and fisheries</li> <li>• Population relocation</li> </ul>	<ul style="list-style-type: none"> <li>• Vested interests</li> <li>• Land tenure</li> <li>• Urbanisation</li> <li>• Global demand on natural resources</li> </ul>
<ul style="list-style-type: none"> <li>• Agricultural production</li> </ul>	<ul style="list-style-type: none"> <li>• Deforestation</li> <li>• Continuous cultivation</li> <li>• overstocking</li> </ul>	<ul style="list-style-type: none"> <li>• Bare lands</li> <li>• Loss of biodiversity</li> <li>• Degraded sites</li> </ul>	<ul style="list-style-type: none"> <li>• Erosion</li> <li>• Nutrient depletion/mining</li> <li>• Low pasture/crop yields</li> <li>• Loss of biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation/reforestation</li> <li>• Enforce relevant acts</li> <li>• Range reseeding</li> <li>• Appropriate soil/water conservation</li> <li>• Capacity building</li> </ul>	<ul style="list-style-type: none"> <li>• Famine</li> <li>• Vested interests</li> <li>• Land tenure</li> <li>• Cultural barriers</li> </ul>

### Results from group 2

<ul style="list-style-type: none"> <li>• High pollution density</li> </ul>	<ul style="list-style-type: none"> <li>• Settlement</li> <li>• Grazing areas</li> <li>• Food security</li> </ul>	<ul style="list-style-type: none"> <li>• Conflict over resources</li> <li>• Malnutrition</li> </ul>	<ul style="list-style-type: none"> <li>• Clashes</li> <li>• Diseases</li> <li>• Soil erosion</li> <li>• Loss of labour</li> </ul>	<ul style="list-style-type: none"> <li>• Formulation of good socio-economic and development policies</li> </ul>	
<ul style="list-style-type: none"> <li>• High poverty levels</li> </ul>	<ul style="list-style-type: none"> <li>• Natural resources e.g. trees, fish, sand harvesting, wildlife</li> </ul>	<ul style="list-style-type: none"> <li>• Over utilization of water and land resources</li> </ul>	<ul style="list-style-type: none"> <li>• Degradation of resources</li> </ul>	<ul style="list-style-type: none"> <li>• Good policies</li> <li>• Employment and wealth creation and distribution</li> </ul>	<ul style="list-style-type: none"> <li>• Poor political will from government and the donor agencies</li> </ul>
<ul style="list-style-type: none"> <li>• Recreation</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Soil compaction</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Specific</li> </ul>	<ul style="list-style-type: none"> <li>• National policies</li> </ul>

	(water, roads) <ul style="list-style-type: none"> <li>• Settlement when coming up with hotels</li> <li>• Deforestation</li> </ul>	<ul style="list-style-type: none"> <li>• Soil erosion</li> </ul>		regulations or directives	
--	---	--	--	---------------------------	--

### Results from Group 3

<ul style="list-style-type: none"> <li>• Human settlement</li> </ul>	<ul style="list-style-type: none"> <li>• Deforestation</li> <li>• Infrastructure roads and water</li> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Soil erosion</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of bio-diversity</li> <li>• Change in water quality or quantity</li> </ul>	<ul style="list-style-type: none"> <li>• Formulation of good policies</li> <li>• Forestation</li> <li>• Appropriate drainage systems to prevent erosion</li> </ul>	<ul style="list-style-type: none"> <li>• Poverty</li> <li>• Insecurity</li> </ul>
<ul style="list-style-type: none"> <li>• Mining (sand, quarrying)</li> </ul>	<ul style="list-style-type: none"> <li>• Construction</li> <li>• Poverty</li> </ul>	<ul style="list-style-type: none"> <li>• Physical degradation</li> <li>• Reduced arable land</li> </ul>	<ul style="list-style-type: none"> <li>• Health problems e.g. malaria</li> <li>• Change in soil structures</li> <li>• Loss of bio-diversity</li> <li>• Death hazards</li> <li>• Interference with water table</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation of quarry sites</li> <li>• Develop policies</li> </ul>	<ul style="list-style-type: none"> <li>• Poverty</li> <li>• Increase of population</li> <li>• Urbanisation</li> </ul>
<ul style="list-style-type: none"> <li>• Agricultural production</li> </ul>	<ul style="list-style-type: none"> <li>• Market demand</li> <li>• Lack of alternative employment</li> <li>• Nutrient mining</li> </ul>	<ul style="list-style-type: none"> <li>• Soil degradation</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of bio-diversity</li> <li>• Soil erosion</li> <li>• Moisture stress</li> <li>• Low crop yields</li> </ul>	<ul style="list-style-type: none"> <li>• Development of appropriate farming practices</li> <li>• Reform agricultural sector (SRA)</li> <li>• Land use policies</li> </ul>	<ul style="list-style-type: none"> <li>• Insecurity</li> <li>• Poverty</li> <li>• Trade barriers (No market in Europe)</li> <li>• Climate change</li> <li>• Inadequate technical capacity on the ground</li> </ul>

<ul style="list-style-type: none"> <li>• Energy e.g. charcoal burning</li> </ul>	<ul style="list-style-type: none"> <li>• Urban demand</li> <li>• Poverty</li> </ul>	<ul style="list-style-type: none"> <li>• Physical degradation</li> <li>• Biological degradation</li> </ul>	<ul style="list-style-type: none"> <li>• Climatic change</li> <li>• Loss of bio-diversity</li> <li>• Soil erosion</li> </ul>	<ul style="list-style-type: none"> <li>• Policies enforcement</li> <li>• Promotion of other cheap alternative sources of energy e.g. solar, biogas, fireless cooker, kunai mobile jikos</li> </ul>	<ul style="list-style-type: none"> <li>• Poverty</li> <li>• Urbanisation</li> </ul>
<ul style="list-style-type: none"> <li>• Wildlife/ecotourism</li> </ul>	<ul style="list-style-type: none"> <li>• Conflict for same resources</li> <li>• Competition of resources</li> </ul>	<ul style="list-style-type: none"> <li>• Soil compaction</li> <li>• Wildlife/human conflicts</li> </ul>	<ul style="list-style-type: none"> <li>• Soil erosion</li> <li>• Killing of wildlife</li> <li>• Loss of human life</li> <li>• Siltation in dams/rivers</li> <li>• Livestock disease transmission</li> </ul>	<ul style="list-style-type: none"> <li>• Creation of electric fences</li> <li>• Transmission of wildlife e.g. elephants</li> <li>• Set up many watering points</li> </ul>	<ul style="list-style-type: none"> <li>• High population</li> </ul>

## **6.0 Agropastoralism Farming Systems, Challenges, Copping Strategies, Opportunities and Best Management Practices by *L.N. Gachimbi***

### **6.1 Introduction**

- Evidence of dramatic decline of food and livestock production in Arid and Semi-Arid Lands (ASALs) of Kenya
- Famine/drought frequency → desertification/land degradation
- Obvious inability of smallholders to afford use of agricultural inputs/available labour
- Soils – shallow, inherent infertility, prone to sealing and crusting
- Rainfall- though bi-annual but unreliable (LR), low and erratic (400-600 mm yr<sup>-1</sup>)
- Poor surface cover during critical crop growing stages
- Households- poorly endowed with resources for farm capital investment e.g. equipment, inputs and labour force for farming operations (e.g. ploughing, weeding)
- Thus low crop and animal production levels

### **Key indicators of land productivity used in classifying farming system in ASAL.**

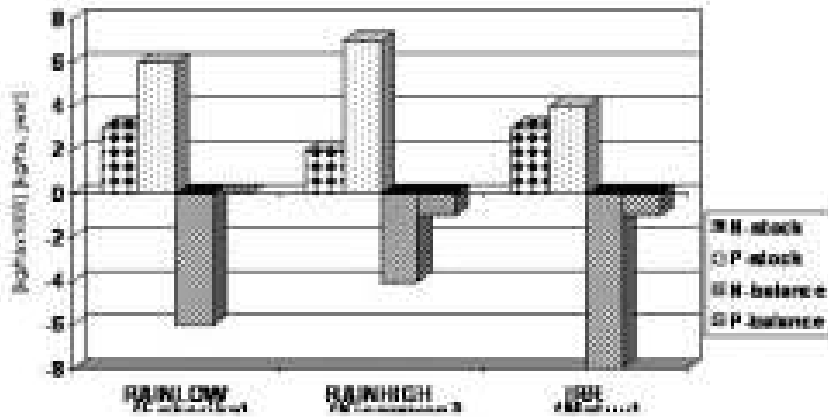
- Agricultural productivity
- Economic performance
- Natural Resource Management
- Food security and livelihood

### **6.2 Farming systems in ASAL according to De Jager et al 2005 and Gachimbi et al 2006**

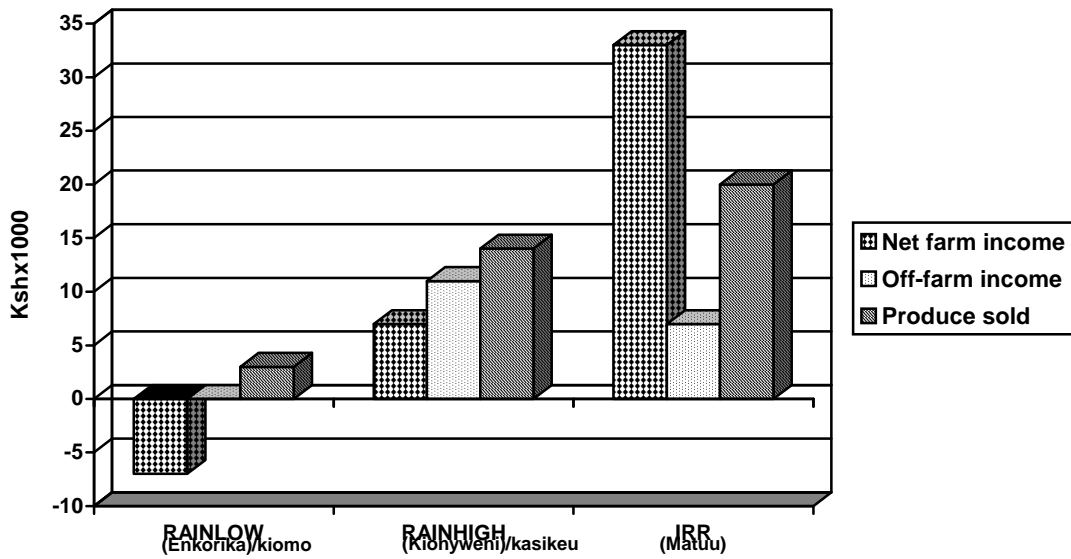
- Rainfed systems in low population density areas (Kajiado, Kiomo) with low rainfall  $\leq 400$  mm per year.
- Rainfed systems in high population density areas (Kionyweni, Kasikeu) with relatively rainfall  $\geq 400$  mm per year
- Irrigated systems (Kibwezi, Matuu)



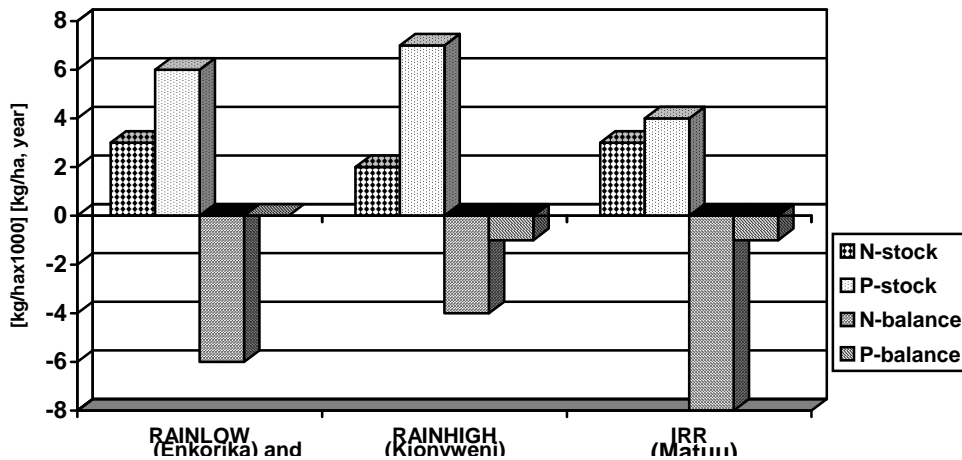
### Current situation in ASAL: Resources



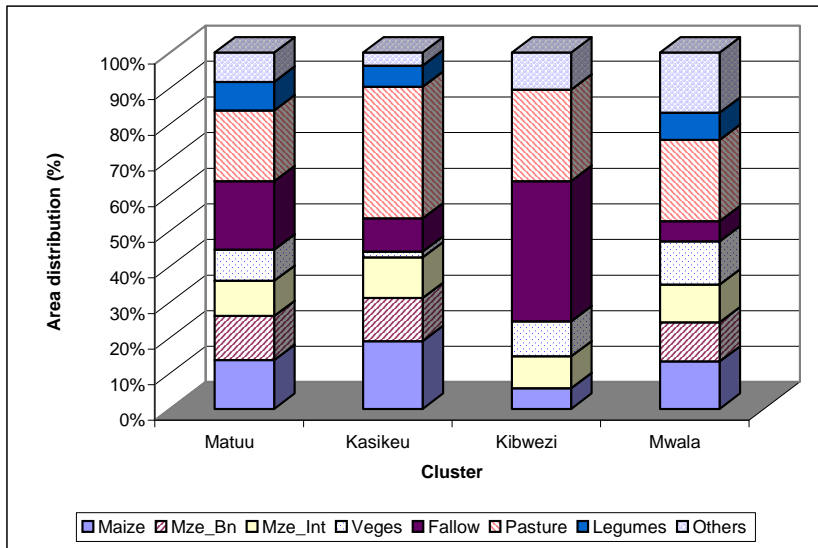
### Current situation: Economic Indicators



### Current situation: soil fertility



## Land use patterns in selected sites:



- Crops grown in Mbeere/Mwingi: Maize beans, maize cowpeas, sorghum, millet, fruit trees, mangoes, passion fruits etc
- Livestock: Sheep/goats, Cattle local breeds and cross breeds
- Management: free range with partial confinement

### 6.3 Mbeere District farming system challenges, causes, coping mechanisms and opportunities: The case study of Kirie location

1. Inadequate water
2. Poor roads
3. Human diseases (Malaria, HIV/AIDS, TB)
4. Illiteracy/low level of education
5. Lack of health facilities
6. Livestock diseases
7. Snake bites/wildlife
8. Inadequate extension services
9. Market/low producer prices
10. Low crop yields
11. Inappropriate technology
12. Low soil fertility
13. Poor soils

14. Lack of credit facilities

15. Soil and water erosion

16. Crop pests and diseases

**Community problem analysis from Kirie community.**

<b>Problem</b>	<b>Causes</b>	<b>Copping mechanism</b>	<b>Opportunities</b>
<b>Lack of credit facilities</b>	<ul style="list-style-type: none"> <li>• Far from urban centers</li> <li>• Poor communication from our centre to those urban centers</li> <li>• Lack of co-operative societies</li> <li>• Lack of organized self help group carrying out merry go round.</li> <li>• Lack of security for the loans to banks</li> </ul>	<ul style="list-style-type: none"> <li>• We look for money through providing casual farm labour</li> <li>• Sale of our farm produce</li> <li>• Sale of our livestock and its by products</li> <li>• Sale of honey</li> <li>• Sale of tree products i.e. charcoal, timber</li> <li>• Sand harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Improved road network (communication)</li> <li>• Formation of co-operative societies</li> <li>• Formation of self help groups doing merry go round</li> <li>• Men to provide land title deeds</li> </ul>
<b>Soil and water erosion</b>	<ul style="list-style-type: none"> <li>• Deforestation</li> <li>• Lack of terraces in our farms</li> <li>• Lack of soil cover in our farms</li> <li>• Burning of vegetation</li> <li>• Lack of protection of river banks</li> <li>• Over stocking or overstocking of livestock</li> <li>• Steep slopes</li> </ul>	<ul style="list-style-type: none"> <li>• Establish agro-forestry farming</li> <li>• Establish soil conservation measures i.e. terraces</li> <li>• Provide permanent soil cover</li> <li>• Restrict burning of vegetation cover</li> <li>• Carry out river bank protection</li> <li>• Avoid overstocking</li> </ul>	<ul style="list-style-type: none"> <li>• Establish tree nurseries</li> <li>• Dig terraces in our farms</li> <li>• Establish vegetation</li> <li>• Capacity building on cover on soil fertility improvement</li> </ul>
<b>Problems of pests and diseases to crops</b>	<ul style="list-style-type: none"> <li>• Lack of chemicals (dawa)</li> <li>• Lack of fund to buy chemicals</li> <li>• Lack of equipment</li> <li>• Lack of education (technical skills)</li> <li>• Resistance to chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• Use of ashes</li> <li>• Use of soil</li> <li>• Use of herbs (mitaa, nduru, muthiira)</li> <li>• Use of hands e.g. (marindi) killing</li> <li>• Spraying of</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity building on skills/training</li> <li>• Credit facilities</li> </ul>

		chemicals	
<b>Low education</b>	<ul style="list-style-type: none"> <li>• Poor staffing</li> <li>• Long distances to schools</li> <li>• Poor facilities</li> <li>• Famine</li> <li>• Poor infrastructure</li> <li>• Poverty</li> <li>• School dropouts</li> <li>• Early marriages</li> <li>• Ending up to polytechnics</li> </ul>	<ul style="list-style-type: none"> <li>• Parents employ P.T.A teachers</li> <li>• Children join school overage</li> <li>• Parents provide school facilities</li> <li>• We sell our resources- livestock; cutting of firewood, charcoal burning etc.</li> <li>• Parents construct manually roads, classrooms etc.</li> <li>• Parents conduct fund raising which does not help much</li> <li>• Parents allow dropouts to look for their survival</li> <li>• Parents guide and counsel overage pupils</li> <li>• Due to poor performance parents choose to take their children to polytechnics</li> </ul>	<ul style="list-style-type: none"> <li>• Government to employ more teachers</li> <li>• Government o construct enough schools</li> <li>• Government to improve infrastructure</li> </ul>

#### 6.4 Stakeholders perception of problems, Causes, Copping mechanism and Opportunities in Mwingi and Mbeere Districts

Table below shows problems, causes, copping mechanism and opportunities available in Mbeere and Mwingi Districts as presented by three groups

##### Results from group 1

Problem	Causes	Copping mechanism	Opportunities
Inadequate water	<ul style="list-style-type: none"> <li>▪ Low rainfall</li> <li>▪ Inadequate water holding structures</li> <li>▪ Destruction of water catchments areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sand dams</li> <li>▪ Shallow wells</li> <li>▪ Water rationing</li> <li>▪ DTCs, local breeds</li> <li>▪ Boil drinking water</li> </ul>	<ul style="list-style-type: none"> <li>▪ Approtech</li> <li>▪ Reforestation</li> <li>▪ Reseeding</li> <li>▪ Grow saline tolerant crops</li> </ul>
Low agricultural productivity	<ul style="list-style-type: none"> <li>▪ Use of inferior seeds/breeds</li> <li>▪ Pests and diseases</li> <li>▪ Low soil fertility</li> <li>▪ Inadequate livestock feeds</li> <li>▪ Erratic rainfall</li> <li>▪ Limited advisory services</li> </ul>	<ul style="list-style-type: none"> <li>▪ Casual employment</li> <li>▪ Use of ITKs</li> <li>▪ Shifting cultivation/grazing</li> <li>▪ Copying (farmer to farmer)</li> <li>▪ Relief</li> <li>▪ Use of ash</li> </ul>	<ul style="list-style-type: none"> <li>▪ High quality seeds/livestock breeds</li> <li>▪ Community seed banks</li> <li>▪ Appropriate technology</li> <li>▪ Capacity building on skills etc</li> </ul>
Loss of biodiversity	<ul style="list-style-type: none"> <li>▪ Continuous cultivation</li> <li>▪ Introduction of exotic materials</li> <li>▪ Inadequate rainfall</li> <li>▪ Overstocking</li> <li>▪ Uncontrolled bush clearing and burning for cultivation</li> <li>▪ Urbanisation and market changes</li> <li>▪ Ignorance and subsequent destruction</li> </ul>	<ul style="list-style-type: none"> <li>▪ Shifting cultivation/grazing</li> <li>▪ Change of feeding habits</li> <li>▪ Controlled grazing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Capacity building</li> <li>▪ Law enforcement</li> <li>▪ Establish community seed banks/germplasm banks</li> </ul>
Inadequate pastures	<ul style="list-style-type: none"> <li>▪ Overstocking</li> <li>▪ Bush encroachment</li> <li>▪ Poor grazing management</li> <li>▪ Inadequate rainfall</li> <li>▪ Shifting (open farm (crop) in grazing land)</li> <li>▪ High population (land subdivision)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sale of livestock</li> <li>▪ Tethering</li> <li>▪ Importation of crop residue</li> <li>▪ Natural regeneration by fencing off</li> <li>▪ Resting grazing areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Capacity building</li> <li>▪ Ground pitting and reseeded</li> <li>▪ Destocking</li> <li>▪ Collective market</li> <li>▪ Seed bulking</li> <li>▪ Pasture conservation</li> </ul>

## Results from Group 2

Recurrent drought	<ul style="list-style-type: none"> <li>▪ Natural phenomena e.g. rainfall failure</li> <li>▪ Climate change</li> </ul>	<ul style="list-style-type: none"> <li>▪ Out migration for human and livestock</li> <li>▪ Casual labour elsewhere</li> <li>▪ Relief supplies from government</li> <li>▪ Food for work</li> <li>▪ Reduced watering frequency for livestock</li> <li>▪ Skipping of meals</li> <li>▪ Destocking</li> <li>▪ Sale of household goods</li> </ul>	<ul style="list-style-type: none"> <li>▪ Construct shallow wells</li> <li>▪ Utilization of donkeys</li> <li>▪ Sinking of boreholes</li> <li>▪ Afforestation</li> <li>▪ Utilization of perennial rivers e.g. Tana, Thuchi, Ena through irrigation</li> </ul>
Soil and water erosion	<ul style="list-style-type: none"> <li>▪ Drought</li> <li>▪ Overstocking</li> <li>▪ Deforestation</li> <li>▪ Inadequate conservation structures</li> <li>▪ Torrential rains</li> <li>▪ Steep slopes</li> <li>▪ Inadequate ground cover</li> <li>▪ Poor farming practices e.g. shifting cultivation</li> <li>▪ Ploughing across the contours</li> </ul>	<ul style="list-style-type: none"> <li>▪ Digging soil conservation structures</li> <li>▪ Fallowing</li> <li>▪ Alternative livelihoods e.g. micro businesses</li> <li>▪ Biological structures like trash lines</li> </ul>	<ul style="list-style-type: none"> <li>▪ Undertake destocking</li> <li>▪ Undertake afforestation</li> <li>▪ Reseeding</li> <li>▪ Capacity building</li> <li>▪ Water harvesting</li> <li>▪ Water development e.g. Boreholes and shallow wells</li> <li>▪ Utilization of arable lands</li> </ul>
Livestock diseases	<ul style="list-style-type: none"> <li>▪ Lack of dips (operational)</li> <li>▪ Inadequate vet services</li> <li>▪ Inadequate knowledge on diseases control and animal husbandry</li> <li>▪ Weather change e.g. too much rainfall causing upsurge e.g. Rift Valley fever</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use of hand sprays</li> <li>▪ Entho veterinary services</li> <li>▪ Crop agriculture on suitable areas</li> <li>▪ Eating of dead carcasses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Capacity building</li> <li>▪ Utilization of ethno veterinary herbs</li> <li>▪ Use of paravets and private AHAs</li> <li>▪ Utilization of extension staff in livestock and agriculture</li> <li>▪ Keep livestock diversification</li> <li>▪ Rehabilitation of non-operational dips</li> </ul>
High poverty levels	<ul style="list-style-type: none"> <li>▪ Low income</li> <li>▪ Ignorance</li> </ul>	<ul style="list-style-type: none"> <li>▪ Casual labour</li> <li>▪ Illicit brewing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provision of land</li> <li>▪ Utilization of water</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Inadequate employment opportunities</li> <li>▪ Poor produce prices</li> <li>▪ Early marriages</li> <li>▪ Laxity and idleness</li> <li>▪ Crop failure due to rainfall</li> <li>▪ Crop pests and diseases</li> </ul>	<ul style="list-style-type: none"> <li>▪ Commercial sex</li> <li>▪ Petty thieving</li> <li>▪ Begging</li> <li>▪ Petty trade</li> <li>▪ Sand harvesting and ballasting</li> <li>▪ Charcoal burning</li> <li>▪ Out migration</li> <li>▪ Dependency on the well to do</li> </ul>	<ul style="list-style-type: none"> <li>resources</li> <li>▪ Formation of self help groups</li> <li>▪ Utilization of local materials e.g. sisal and palm</li> </ul>
--	---	---	--

### Results from group 3

Inadequate water	<ul style="list-style-type: none"> <li>▪ Low amount of rainfall</li> <li>▪ Poor distribution of rainfall</li> <li>▪ Inadequate water harvesting techniques</li> <li>▪ Soil types (sandy)</li> </ul>		<ul style="list-style-type: none"> <li>▪ Up scaling water harvesting techniques e.g. rock catchments, roof water harvesting, run-off water harvesting</li> <li>▪ Sinking boreholes</li> <li>▪ Construction of dams/water pans</li> <li>▪ Use conservation agriculture (CA)</li> <li>▪ Water saving technologies e.g. drip irrigation</li> </ul>
Low crop yields	<ul style="list-style-type: none"> <li>▪ Lack of knowledge</li> <li>▪ Low soil fertility mainly or N, P, K, and C</li> <li>▪ Poor quality seeds</li> <li>▪ Late planting</li> <li>▪ Low erratic rainfall</li> <li>▪ Wrong enterprise selection</li> <li>▪ Continuous cultivation</li> <li>▪ Pests/diseases</li> <li>▪ Monocropping</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use of farm yard manure</li> <li>▪ Relief seeds supply/food supply</li> <li>▪ Skipping meals</li> <li>▪ Diversification of enterprises e.g. livestock and crops to include fruit trees</li> <li>▪ Use indigenous technical knowledge (ITK)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Integrated nutrient management (INM)</li> <li>▪ Capacity building</li> <li>▪ Use of certified seeds</li> <li>▪ Timely planting</li> <li>▪ Training on enterprise selection</li> <li>▪ Use CA</li> <li>▪ Crop rotation</li> </ul>
Soil erosion	<ul style="list-style-type: none"> <li>▪ Overstocking/overgrazing</li> <li>▪ Deforestation</li> <li>▪ Inadequate soil cover</li> </ul>	<ul style="list-style-type: none"> <li>▪ Terracing</li> <li>▪ Shifting cultivation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Rehabilitation of the denuded land</li> <li>▪ Up scaling of CA</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Burning of vegetation</li> <li>▪ Inadequate soil conservation measures</li> <li>▪ Inadequately protected river banks</li> <li>▪ Road run-off</li> </ul>		<ul style="list-style-type: none"> <li>▪ Enforcement of government policies on land use</li> <li>▪ Reafforestation/agroforestry</li> </ul>
Poor roads	<ul style="list-style-type: none"> <li>▪ Inadequate maintenance</li> <li>▪ Sodic and sandy soils</li> <li>▪ Unchecked road run-off</li> <li>▪ Inadequate political will</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use of Bonda-Bonda</li> <li>▪ Trekking</li> <li>▪ Community initiation</li> <li>▪ Use of donkeys/oxen</li> <li>▪ Youth volunteers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Routine road maintenance through CDF/LATF</li> <li>▪ Adequate political good will</li> <li>▪ Safe discharge of road run-off</li> <li>▪ Harvesting road run-off for crop production</li> </ul>
Human diseases e.g. HIV/AIDS, TB	<ul style="list-style-type: none"> <li>▪ Drug abuse</li> <li>▪ Poverty</li> <li>▪ Poor nutrition</li> <li>▪ Moral decay</li> <li>▪ Poor hygienic sanitation</li> <li>▪ Inadequate health services</li> <li>▪ Low education standards</li> </ul>	<ul style="list-style-type: none"> <li>▪ Herbal medicine</li> <li>▪ Witch doctors</li> <li>▪ Observe good moral standards</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness creation</li> <li>▪ Capacity building</li> </ul>



## **7.0 Agropastoral FFs Land Degradation Curriculum Development by Stella Obanyi and L. N. Gachimbi**

### **7.1 Purpose of the curriculum**

- Integration of all issues concerning land degradation
- Identify ways of tackling the problems
- Priority setting

### **Modules or major themes**

- Soil and Water management
  - Soil properties and functions
  - Soil fertility management
  - Soil and water conservation
  - Concepts and principles of integrated nutrient management
  - Water management
- Crop production
- Livestock management and other opportunities
- Energy e.g. charcoal burning
- Wildlife

### **Objectives**

- Identify, monitor and evaluate causes of soil fertility decline
- Develop and test quick and efficient tools to diagnose productivity

### **Activities under each module**

- Diagnosis
- Priority setting
- Experimentation
- Generate appropriate and effective technology to address soil fertility decline (SFD) problem
- Develop participatory policy formulation process to address SFD

### **Materials**

- Land
- Seeds
- Fertilizers

## 7.2 Stakeholders perception of Agro pastoral FFs curriculum development

### Results from group 1

#### Broad objective

Training for community to reduce/combat land degradation

#### Special objectives

- To improve soil fertility management
- To improve water harvesting for sustainable crop and livestock management
- To improve on farm value addition for increased farm income
- To improve on existing biodiversity

Main module	Topics/materials
Soil properties	<ul style="list-style-type: none"> <li>• Soil types</li> <li>• Soil profiles</li> </ul>
Signs of soil erosion	<ul style="list-style-type: none"> <li>• Field observations/discussion, posters</li> </ul>
Soil conservation measures	<ul style="list-style-type: none"> <li>• Pictorial materials</li> <li>• Types of conservation structures</li> <li>• Tools, equipment</li> <li>• Posters</li> <li>• Conserved farms</li> </ul>
Nutrient deficiencies	<ul style="list-style-type: none"> <li>• pictorials</li> <li>• Field indicators of deficiencies</li> <li>• Soil sampling and demonstrations</li> </ul>
Soil fertility improvement	<ul style="list-style-type: none"> <li>• Organic manures (FYM, compost, green)</li> <li>• Mineral fertilizers</li> <li>• Crop rotation</li> <li>• Cover cropping</li> <li>• Agro forestry</li> <li>• Improved fallows</li> <li>• Manure collection/management</li> </ul>
Water harvesting <ul style="list-style-type: none"> <li>▪ Livestock and domestic use</li> <li>▪ Pasture and crops</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pans, dams, ferro-tanks, shallow wells, road run-off</li> <li>▪ Retention ditches, tied ditches, soaking pits, semi circular infiltration bunds, negarims, tools and equipment</li> </ul>
Fodder supply	<ul style="list-style-type: none"> <li>▪ Types of fodder, pictorials, demonstrations, utilization, bulking sites, conservation/preservation (hay, silage, crop residue) and related Participatory technology development trials</li> </ul>
Livestock management	<ul style="list-style-type: none"> <li>▪ Breed: selection, management, feeding programmes and disease/pest control, Housing</li> <li>▪ Emerging breed stocks (diversification) e.g. Guinea fowl etc</li> <li>▪ Ethno veterinary Indigenous technical knowledge</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Marketing of livestock products</li> </ul>
Value addition/marketing	<ul style="list-style-type: none"> <li>▪ Crop and animal products</li> <li>▪ Value chain</li> <li>▪ Market space and linkages</li> </ul>
Integrated Nutrient Management	<ul style="list-style-type: none"> <li>▪ Types of manure and fertilizers</li> <li>▪ Outflows (crops/livestock produce) and Inflows</li> </ul>
IPM	<ul style="list-style-type: none"> <li>▪ Cultural methods, biological – prey predators, physical/mechanical and chemical - synthetics</li> </ul>
Special topics	<ul style="list-style-type: none"> <li>▪ Marketing <ul style="list-style-type: none"> <li>- types, channels, distribution, space, surveys, source information, linkages, corrective marketing, agro businesses</li> </ul> </li> <li>▪ Credits <ul style="list-style-type: none"> <li>- credit institutions, interest rates/terms of borrowing, collaterals, repayment, risks, uncertainties</li> </ul> </li> <li>• Proposal writing <ul style="list-style-type: none"> <li>- enterprise, resources, location</li> </ul> </li> <li>▪ Leadership and governance <ul style="list-style-type: none"> <li>- Qualities, account, group dynamics/conflicts, human rights, gender issues</li> </ul> </li> <li>▪ Social integrations <ul style="list-style-type: none"> <li>- Institutionalisation and sustainability of FFS</li> </ul> </li> </ul>
Cross cutting issues	<p>HIV/AIDS Objectives</p> <ul style="list-style-type: none"> <li>- Empower communities</li> <li>- Training for community empowerment to reduce/combat land degradation</li> </ul>

## Curriculum results from group 2

### Modules

1. General background on FFS concept, principles and processes of agro pastoral FFS
  2. Fundamentals of soil fertility management
  3. Livestock management
  4. Crop husbandry
  5. Special topics
- 
1. General background on FFS concept, principles and processes of agro pastoral FFS
    - (i) Concept
    - (ii) Principles
    - (iii) Processes
  2. Fundamentals of soil fertility management
    - (i) Soil organic matter management
      - Mulching-ground cover
      - Farm yard manure application
    - (ii) Nutrient input management
      - Mineral fertilizer application
      - Legume rotation, intercropping
    - (iii) Soil and water conservation
      - Insitu water harvesting/moisture retention
      - Soil conservation measures (physical, biological, ridges)
      - Agro forestry
  3. Livestock management
    - Production systems
      - (i) Free range
      - (ii) Tethering
      - (iii) Semi zero grazing
      - (iv) Zero grazing
        - Feeding
          - (i) Fodder/pasture establishment
          - (ii) Utilization and conservation
          - (iii) Supplementation
        - Collection and management of manure
  4. Crop husbandry
    - Appropriate varieties
    - (i) Seed quality e.g. selection, storage
  5. Special topics
    - Gender and HIV/AIDS
    - Leadership and governance
    - Human rights
    - Marketing
    - Credit accessibility

### Curriculum results from group 3

Theme	Topic	Objective	Activities/PTDs	Materials
Soil fertility improvement	<ul style="list-style-type: none"> <li>▪ Soil properties and functions</li> <li>▪ Soil analysis</li> <li>▪ Soil fertility improvement</li> <li>▪ Soil/water conservation measures</li> <li>▪ Conservation agriculture</li> <li>▪ Plant nutrition</li> </ul>	<ul style="list-style-type: none"> <li>▪ To improve soil fertility for increased productivity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Setting experimental plots</li> <li>▪ Agro ecological System Analysis (AESA)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Land</li> <li>▪ Seeds</li> <li>▪ Fertilizer (organic/inorganic)</li> <li>▪ Simple equipment for soil analysis</li> <li>▪ Rippers/subsoilers</li> </ul>
Energy conservation	<ul style="list-style-type: none"> <li>▪ Agro forestry</li> <li>▪ Tree nursery establishment and management</li> <li>▪ Alternative sources of energy</li> <li>▪ Tree management</li> <li>▪ Energy conservation</li> <li>▪ Invasive trees/weeds</li> </ul>	<ul style="list-style-type: none"> <li>▪ To increase/improve soil cover through afforestation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Establishment of woodlot for fuel</li> <li>▪ Setting experimental plots (AESA)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Land</li> <li>▪ Seeds</li> <li>▪ Nursery kits/tools</li> <li>▪ Water</li> </ul>
Pasture/fodder management and utilization	<ul style="list-style-type: none"> <li>▪ Fodder/pasture establishment</li> <li>▪ Fodder/pasture management</li> <li>▪ Fodder/pasture conservation</li> <li>▪ Fodder/pasture utilization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improve on animal nutrition status by using high yielding fodder or pasture</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reseeding</li> <li>▪ Establishment of fodder/pasture plots</li> <li>▪ AESA</li> </ul>	<ul style="list-style-type: none"> <li>▪ Land</li> <li>▪ Seeds</li> <li>▪ Baling boxes</li> </ul>
Special topics	<ul style="list-style-type: none"> <li>▪ HIV/AIDS</li> <li>▪ Group dynamics</li> <li>▪ Leadership</li> <li>▪ Drug abuse</li> <li>▪ Human rights</li> <li>▪ Good governance</li> <li>▪ Marketing</li> </ul>			

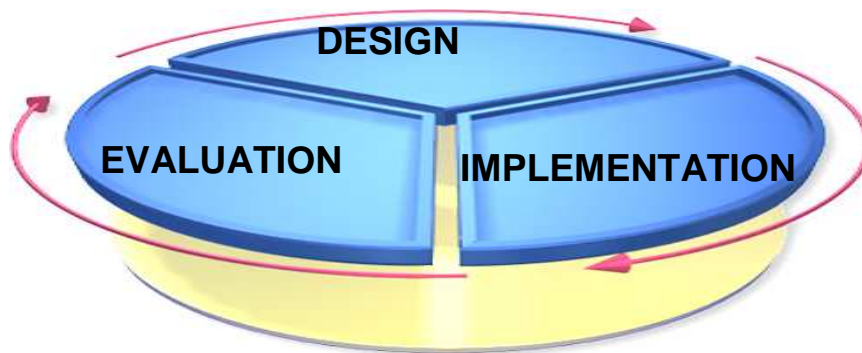
## 8.0 Introduction to Participatory Monitoring and Evaluation for Agro-Pastoral Farmer Field Schools Project by *L. N. Gachimbi and P.T.Gicheru*

### 8.1 Why participatory monitoring and evaluation

- Generate information to help stakeholders at all levels to monitor the progress and performance of the project components and activities including quantity, quality, timeliness and cost effectiveness of outputs delivered during the implementation phase
- Provide systematic means for periodic assessment of the relevance, adequacy equity, and sustainability of the resultant outcomes and impacts
- Provide a means for verifying accountability for decisions and actions taken, and results achieved in relation to resource used from the stand point on GEF

### 8.2 The Logical Framework

It is a tool to help strengthen project design, implementation and evaluation



#### Logical framework approach

##### Analysis phase

- **Problem analysis** – Identifying key problems, constraints and opportunities, determining causes and effects relationships
- **Analysis of objectives** – developing objectives from the identified problems, identifying means to end relationships
- **Strategy analysis** – Identifying the different strategies to achieve objectives, determining the overall objective and purpose

##### Planning phase

- **Log frame** – defining the project structure, testing its internal logic and formulating objectives in measurable terms
- **Activity schedule** – determining the sequence and dependency of activities: estimating the duration, setting milestones and assigning responsibility.
- **Resource scheduling** – from the activity schedule developing input schedule and a budget.

### Logical framework strengths

- Meets requirements of good project design
- Responds to past weaknesses in many designs
- Is easy to learn and use
- Does not add time nor effort, but reduces it
- Can be used internally for the design and appraisal process
- Can be used externally with your consultants
- Anticipates implementation
- Sets framework for evaluation

### 8.3 Structure and contents of logical framework

<b>Objectives Hierarchy</b> (Narrative summary, intervention logic)	<b>Performance Questions and indicators</b> (Objectively verifiable indicators, targets)	<b>Monitoring Mechanisms</b> (Means of Verification, sources of information)	<b>Assumptions and Risks</b>
<b>Goal</b> (Overall objective, development objective) The long-term objective, change of state or improved situation towards which the project is making a contribution	Performance questions and indicators at goal level – high-level impacts	How necessary information will be gathered	For long-term sustainability of the project
<b>Purpose</b> (Project development objective) The immediate project objective, the overall observable changes in performance, behavior or resource status that should occur as a result of the project	Performance questions and indicators for each purpose (component) – lower-level impact and outcome indicators	How necessary information will be gathered	Assumptions in moving from purpose to goal

<p><b>Outputs</b> (Results)</p> <p>The products, services or results that must be delivered by the project for the component objectives and purpose to be achieved</p>	<p>Performance questions and indicators for each output – output indicators</p>	<p>How necessary information will be gathered</p>	<p>Assumptions in moving from outputs to purposes</p>
<p><b>Activities</b></p> <p>The actions taken by the project that are required for delivery of the outputs</p>	<p>Note: the needed inputs go here, not indicators for activities</p>		<p>Assumptions in moving from activities to outputs</p>

### Ensuring you has Smart Objectives

The goal, purpose, component objectives, outputs and activities should be SMART if they are to be impact oriented

- Specific
- Measurable
- Achievable
- Relevant (to the project purpose and goal)
- Time-framed

But don't get too SMART!

- What is achievable may need to be developed from experience
- Good ideas take time to develop
- Not everything that is worth doing can be easily measured.

### M&E answers questions related to:

- **Relevance** (Does the project address our need?)
- **Efficiency** (Are we using resources wisely?)
- **Effectiveness** (Are the desired results achieved?)
- **Impact** (To what extent have project activities brought about changes for the betterment of individuals and / or community?)
- **Sustainability** (What is the likelihood that achievements made will be sustained?)

### Examples of performance questions

Performance questions are asked for each level of the objective hierarchy

Examples:



- **Activity level** – What have we actually done?
- **Output level** – What have we delivered as a result of project activities?
- **Purpose level (Outcome)** – What has been achieved as a result of the output?
- **Goal level (Impact)** – What has been achieved as a result of the outcomes? What contribution is being made to the goal? Are there any unanticipated positive or negative impacts?

### **Monitoring tools and reporting**

These are identified according to the different components and different levels of involvement in the project management and implementation.

- Beneficiary level / Community level
- District level
- Provincial level
- Secretariat level (Headquarters)
- National Steering Committee

At each level the reporting frequency and contents of reports and who is responsible for reporting should be clear.

## **8.4 Verifiable indicators**

### **Definition**

Quantitative or qualitative factor or variable that provides a simple and reliable basis for assessing achievement, change or performance. A unit of information measured over time that can help show changes in a specific condition. A given goal or objective can have multiple indicators.

### **Key Concepts:**

- If we can measure it we can manage it
- Indicators must be targeted in terms of Quantity, Quality and Time (QQT).
- Indicators at the Purpose level measure End of Project Impact.
- Indicators and Means of Verification must be practical and cost-effective.
- Indicators and Means of Verification provide the basis for project monitoring and evaluation systems.

### **Key Questions**

Measurements	:	By what?
Target Group	:	For whom?
Quantity	:	How much?

Quality	:	How well?
Time	:	By when?
Location	:	Where?

### Ensuring that OVIs are Specific

Defining Indicators - QQT

**Objective:** Capacity and empowerment for SLM enhanced

- **Set quality** (the nature of the indicator): Percentage of community members trained/empowered effectively in SLM technologies
- **Set Target group** (who): Local communities and service providers
- **Set place** (where): Operation Areas (OAs)
- **Set quantity:** Proportion of farmers trained adopting new SLM technologies from X to Y
- **Set time:** Proportion of farmers trained adopting new SLM technologies from X to Y by the year 2010

### Example of output and outcome indicator

**Output:** - Capacity of the agricultural extension service and skills of extension workers improved.

**Output Indicator:** - Number of extension workers trained.

**Outcome Indicators:** - Farmers are developing and adopting improved agricultural practices  
: - Increased productivity and income for farmers.

Outcomes should be included as indicators at the purpose level.

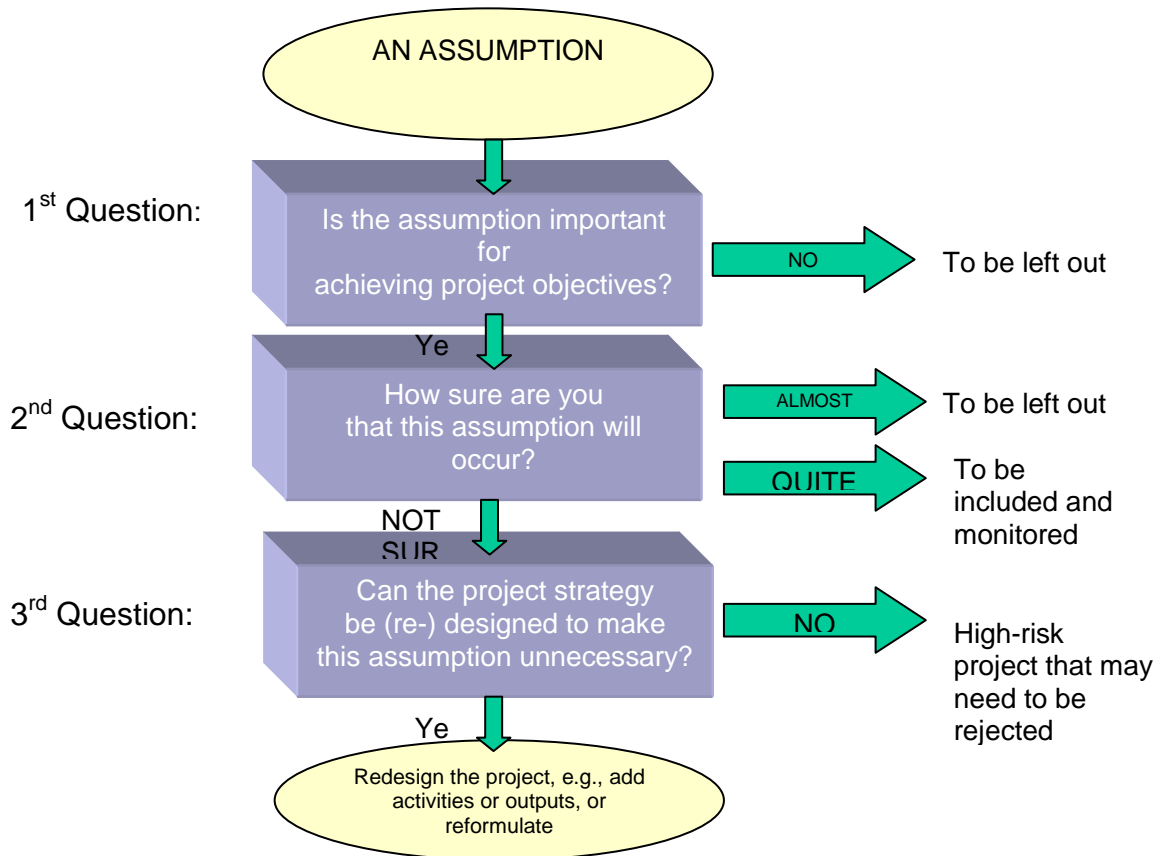
### A good indicator is:

- **Substantial:** It reflects an essential aspect of the objective.
- **Independent:** It can only be used at one level.
- **Factual:** It must relate to facts and give the same result regardless of who is measuring it.
- **Plausible:** Changes recorded can be directly attributed to the project and not other events.
- Based on obtainable data either from sources outside the project or which can be developed without too much costs.

### 8.5 Assumptions

- These are external factors beyond the control of the project management, which must take place for the means-ends relation to hold.
- Are worded as positive conditions (=Objectives)
- Are linked to the different levels in the means-ends relation.
- Shall be weighted according to importance and probability

## Deciding which assumptions are important to keep



After the plenary presentations a drawn draft logframe was shared with the stakeholders. Three groups were formed to compare planned components, intervention logic, objectively verifiable indicators (OVIS). Means of verification and assumptions. Table X shows the harmonized log frame applicable in Mbeere and Mwingi Districts.

**8.6 Harmonised master (Interlocking) Log frame for using farmer field schools approaches to overcome land degradation in agro- pastoral areas of Kenya**

Project components	Building Capacity for Sustainable Land Management (SLM) in Agro-pastoral areas	Strengthening the Enabling Environment for SLM in Agro-pastoral areas	Project Coordination and management
<p><b>Goal (Overall Objective)</b> To support control of land degradation in the drylands of Kenya through implementation of sustainable land use management practises.</p>			
<p><b>Purpose (Intermediate Objective)</b> Remove capacity related barriers impeding the adoption of SLM – on the ground community actions and dissemination of innovations and SLM practises through FFS</p>	<p><b>Goal</b> To contribute to reduction and mitigation of land degradation in agro pastoral areas by accelerating uptake of locally driven sustainable land management practices</p>	<p><b>Goal</b> To contribute to reduction and mitigation of land degradation in agro pastoral communities by accelerating uptake of locally driven sustainable land management practices</p>	<p><b>Goal</b> To contribute to reduction and mitigation of land degradation in agro pastoral communities by accelerating uptake of locally driven sustainable land management practices</p>
<p><b>Results/Outputs (Specific Objectives)</b></p> <ol style="list-style-type: none"> <li>1. Capacity for sustainable land management enhanced</li> <li>2. Enabling environment for SLM strengthened</li> <li>3. Project coordination and management strengthened</li> </ol>	<p><b>Purpose</b> To enhance the capacity of targeted communities and service providers for sustainable land management</p>	<p><b>Purpose</b> To strengthen the enabling environment necessary for mainstreaming SLM approaches through the policy and institutional landscape</p>	<p><b>Purpose</b> To strengthen project coordination, monitoring and evaluation at district and grassroots levels</p>
<p><b>Activities</b></p> <ol style="list-style-type: none"> <li>1.1 Strengthen local communities capacity and empowerment for SLM</li> </ol>	<p><b>Results/Outputs</b></p> <ol style="list-style-type: none"> <li>1. Local communities capacity and empowerment for SLM</li> </ol>	<p><b>Results/Outputs</b></p> <ol style="list-style-type: none"> <li>1. Enabling sound policy framework for SLM established and strengthened</li> <li>2. Knowledge and information base for</li> </ol>	<p><b>Results/Outputs</b></p> <ol style="list-style-type: none"> <li>1. Coordination of the project facilitated and supported</li> </ol>

<b>Project components</b>	<b>Building Capacity for Sustainable Land Management (SLM) in Agro-pastoral areas</b>	<b>Strengthening the Enabling Environment for SLM in Agro-pastoral areas</b>	<b>Project Coordination and management</b>
<ul style="list-style-type: none"> <li>1.2 Strengthen SLM oriented service provision</li> <li>1.3 Facilitate improvement of knowledge and information base for SLM in AgPFFs</li> <li>1.4 Strengthen institutions relevant to the promotion of sustainable land management</li> <li>1.5 Support and facilitate coordination of the project</li> <li>1.6 Support participatory monitoring and evaluation of the project</li> <li>1.7 Support integration of gender and vulnerable members of communities in the project</li> </ul>	<ul style="list-style-type: none"> <li>strengthened through FFS approach</li> <li>2. SLM oriented service provision strengthened</li> </ul>	<ul style="list-style-type: none"> <li>SLM improved</li> <li>3. Institutions relevant to the promotion of sustainable land management strengthened</li> </ul>	<ul style="list-style-type: none"> <li>2. Participatory Monitoring and Evaluation of the project supported</li> <li>3. Integration of gender and vulnerable members in the project supported</li> </ul>

### 8.6.1 Logical Framework for Building Capacity for Sustainable Land Management

Intervention Logic/Narrative summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions
<p><b>Goal (Overall Objective)</b> To support control of land degradation in the drylands of Kenya through implementation of sustainable land use management practises</p>	<ul style="list-style-type: none"> <li>• 30% increase in number of farmers involved and promoting SLM activities by June 2012</li> <li>• Increase in livestock carrying capacity by 2012</li> <li>• 30% increase in land under vegetative cover in selected operational areas by June 2012</li> <li>• 20% increase in vegetation through improved ground cover in agropastoral areas of pilot districts by June 2012</li> <li>• Positive nutrient balance at farm and catchments level (in and outflows) by June 2012</li> <li>• 20% yield increase of major crops and pasture in Mbeere/Mwingi districts by June 2012</li> <li>• 5% increase in income at household level by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project M&amp;E reports</li> <li>• Project progress and annual reports</li> <li>• Impact surveys/ baseline survey by independent organization</li> <li>• Development index indicators</li> <li>• No of SLM farmer field schools established</li> </ul>	<ul style="list-style-type: none"> <li>• Socio-economic and political stability</li> <li>• There will be political good will and support</li> <li>• Favorable policies</li> <li>• Favorable weather</li> <li>• Timely disbursement of resources</li> </ul>
<p><b>Purpose (Intermediate Objective)</b> Remove capacity related barriers impeding the adoption of SLM – on the ground community actions and dissemination of innovations and SLM practises through FFS</p>	<ul style="list-style-type: none"> <li>• 30% increase in farmers/pastoralists adopting new SLM technologies by June 2012</li> <li>• 25% increase in areas covered with new technologies by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• M&amp;E reports</li> <li>• Survey reports</li> </ul>	<ul style="list-style-type: none"> <li>• Socio-economic and political stability</li> <li>• There will be political good will and support</li> <li>• Favorable weather</li> </ul>
<p><b>Results/Outputs (Specific Objectives)</b> 1. Local communities capacity and empowerment for SLM strengthened through FFS</p>	<ul style="list-style-type: none"> <li>• At least 30% of the target communities members trained/empowered effectively involved in SLM activities (at least 15% women, 5% youth) by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Survey/inventory</li> </ul>	<ul style="list-style-type: none"> <li>• There will be political good will and support</li> </ul>

Intervention Logic/Narrative summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions
2. SLM oriented service provision strengthened in agropastoral areas	<ul style="list-style-type: none"> <li>• Proportion of farmers trained adopting new SLM technologies by June 2012 (at least 15% women, 5% youth, 10% men)</li> <li>• 80% of service providers trained satisfactorily delivering SLM oriented service by June 2012</li> <li>• 5 local SLM institutions per district (e.g. environmental groups) created and functioning by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>reports</li> <li>• Monitoring and Evaluation reports</li> <li>• FFS coordinator reports</li> </ul>	
<p><b>Result 1</b></p> <p>1.1. Organize and conduct awareness building workshops/ meetings on SLM practices at District level and Location level</p>	<ul style="list-style-type: none"> <li>• 2 sensitization workshops (ToT) attended by 30 participants each at district level by December 2007.</li> <li>• FFS meetings attended by 100 persons at community level per district by December 2007</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Workshop reports</li> <li>• List of attendants/FFs groups formed</li> <li>• Workshop training manuals</li> <li>• FFs curriculum developed</li> </ul>	<ul style="list-style-type: none"> <li>• Funds are available and timely</li> <li>• Funds are timely available</li> <li>• Funds are</li> </ul>

Intervention Logic/Narrative summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions
1.2 Facilitate development of community action plans	<ul style="list-style-type: none"> <li>• 19 sub-location workshops held by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Workshop reports</li> <li>• List of attendants</li> <li>• Community action plan</li> </ul>	<p>timely available</p> <ul style="list-style-type: none"> <li>• Funds are timely available</li> </ul>
1.3 Conduct participatory on-farm SLM practices <ul style="list-style-type: none"> <li>a) Evaluation and demonstration in project sites/sub location</li> <li>b) Field days</li> <li>c) Community exchange visits</li> </ul>	<ul style="list-style-type: none"> <li>• 4 FFS demonstration sites per district established for each of the divisions by June 2012</li> <li>• 4 field days for each of the pilot demonstration sites per district by June 2012</li> <li>• 3 one-day exchange visits involving 30 farmers per exchange (1 exchange per district) by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Field day reports</li> <li>• List of attendants</li> <li>• Exchange visit reports</li> <li>• SLM practices AESA evaluation reports</li> </ul>	



## 8.6.2 Logical Framework for Strengthening the Enabling Environment for Sustainable Land Management

Intervention Logic/Narrative summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions
<p><b>Goal (Overall Objective)</b> To support control of land degradation in the drylands of Kenya through implementation of sustainable land use management practises</p>	<ul style="list-style-type: none"> <li>• 30% increase in number of farmers involved and promoting SLM activities by June 2012</li> <li>• Increase in livestock carrying capacity by 2012</li> <li>• 30% increase in land under vegetative cover in selected operational areas by June 2012</li> <li>• 20% increase in vegetation through improved ground cover in agropastoral areas of pilot districts by June 2012</li> <li>• Positive nutrient balance at farm and catchments level (in and outflows) by June 2012</li> <li>• 20% yield increase of major crops and pasture in Mbeere/Mwingi districts by June 2012</li> <li>• 5% increase in income at household level by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project M&amp;E reports</li> <li>• Project progress and Annual reports</li> <li>• Impact surveys/ baseline survey by independent organization</li> <li>• Development index indicators</li> </ul>	<ul style="list-style-type: none"> <li>• There will be political good will and support</li> </ul>
<p><b>Purpose (Intermediate Objective)</b> Remove capacity related barriers impeding the adoption of SLM – on the ground community actions and dissemination of innovations and SLM practises through FFS</p>	<ul style="list-style-type: none"> <li>• Functional institutions on SLM in place by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project M&amp;E reports</li> <li>• Project progress and Annual reports</li> <li>• Survey reports</li> </ul>	<ul style="list-style-type: none"> <li>• There will be political good will and support</li> </ul>
<p><b>Results/Outputs (Specific Objectives)</b> 1. Institutions relevant to the</p>	<ul style="list-style-type: none"> <li>• 100% of policy makers and other stakeholders sensitized who are</li> </ul>	<ul style="list-style-type: none"> <li>• Project M&amp;E reports</li> <li>• Project progress and Annual reports</li> </ul>	<ul style="list-style-type: none"> <li>• There will be political good will and support</li> </ul>

<b>Intervention Logic/Narrative summary</b>	<b>Objectively Verifiable Indicators (OVIs)</b>	<b>Means of Verification (MoV)</b>	<b>Assumptions</b>
promotion of sustainable land management established and strengthened	<ul style="list-style-type: none"> <li>able to make informed decisions about SLM issues by June 2010</li> <li>5 functioning local institutions (per district) SLM by June 2012</li> </ul>		
<b>Activities</b>			
1.1 Conduct sensitization workshops targeting local policy makers	<ul style="list-style-type: none"> <li>12 division level workshops per district attended by Cobs, NGOs, Village leaders by June 2012</li> <li>Six (6) sensitization workshops (2 per year) attended by policy makers at District level by September 2012</li> </ul>	<ul style="list-style-type: none"> <li>Workshop reports</li> <li>List of participants</li> <li>Letters of invitation</li> </ul>	<ul style="list-style-type: none"> <li>Funds are timely available</li> <li>Political good will</li> </ul>
1.2 Farmer field schools formed (FFS)	<ul style="list-style-type: none"> <li>12 FFS comprising 30 members formed per district by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>List of members</li> <li>Certificate of registration/Accounts</li> <li>Income generating activities (IGA) started</li> </ul>	<ul style="list-style-type: none"> <li>Timely availability of funds</li> <li>Political good will</li> </ul>
1.3 Train farmers on Sustainable land Management practices (e.g. soil and water conservation technologies, water harvesting, organic matter management, agro forestry, conservation agriculture etc)	<ul style="list-style-type: none"> <li>Each FFs group trained for 40 sessions per year (40*12 = 480 sessions) by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>Attendance list</li> <li>AESA</li> <li>Reports</li> </ul>	<ul style="list-style-type: none"> <li>Timely availability of funds</li> <li>Political good will</li> </ul>
1.4 Establishment of Farmer field schools (FFs) experimental plots	<ul style="list-style-type: none"> <li>48 demonstration plots (4 each by the 12 FFS formed) established by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>Attendant list</li> <li>Experimental plots</li> <li>AESA reports</li> <li>Progress report</li> <li>Duty rooster</li> </ul>	<ul style="list-style-type: none"> <li>Political good will/support</li> <li>Timely availability of funds</li> <li>Favorable weather</li> </ul>

<b>Intervention Logic/Narrative summary</b>	<b>Objectively Verifiable Indicators (OVIs)</b>	<b>Means of Verification (MoV)</b>	<b>Assumptions</b>
1.5 Carry out field days and exchange visits	<ul style="list-style-type: none"> <li>• 12 field days and 3 exchange visits conducted by 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Attendance lists</li> <li>• Field reports</li> <li>• Invitation letter</li> <li>• Poster/days programme</li> <li>• Letter to request visit</li> <li>• Exchange visit report</li> </ul>	<ul style="list-style-type: none"> <li>• Political good will</li> <li>• Successful demonstration plots.</li> <li>• Timely availability of funds</li> </ul>
1.6 FFS conduct graduation ceremonies	<ul style="list-style-type: none"> <li>• FFs groups graduate by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• List of attendance</li> <li>• Graduation reports</li> <li>• Invitation letters</li> <li>• Visitors lists</li> <li>• Days programme</li> <li>• Sample certificate</li> </ul>	<ul style="list-style-type: none"> <li>• Timely availability of funds</li> <li>• Political good will</li> <li>• Successful completion of training</li> </ul>

### 8.6.3 Logical Framework for Project Coordination, Monitoring and Evaluation

Intervention Logic/Narrative summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions
<p><b>Goal (Overall Objective)</b> To support control of land degradation in the drylands of Kenya through implementation of sustainable land use management practises</p>	<ul style="list-style-type: none"> <li>• 30% increase in number of farmers involved and promoting SLM activities by June 2012</li> <li>• Increase in livestock carrying capacity by 2012</li> <li>• 30% increase in land under vegetative cover in selected operational areas by June 2012</li> <li>• 20% increase in vegetation through improved ground cover in agropastoral areas of pilot districts by June 2010</li> <li>• Positive nutrient balance at farm and catchments level (in and outflows) by June 2012</li> <li>• 20% yield increase of major crops and pasture in Mbeere/Mwingi districts by June 2012</li> <li>• 5% increase in income at household level by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project M&amp;E reports</li> <li>• Project progress and Annual reports</li> <li>• Impact surveys/ baseline survey by independent organization</li> <li>• Development index indicators</li> </ul>	<ul style="list-style-type: none"> <li>• Government/political commitment will be maintained</li> <li>• Development Partner support will be continued</li> </ul>
<p><b>Purpose (Intermediate Objective)</b> Remove capacity related barriers impeding the adoption of SLM – on the ground community actions and dissemination of innovations and SLM practises through FFS</p>	<ul style="list-style-type: none"> <li>• A well coordinated, efficient and effective project by June 2007</li> <li>• Percent adherence to work-plans and budget requirements throughout the project period</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Coordinators reports</li> </ul>	<ul style="list-style-type: none"> <li>• Continued government support</li> <li>• Human resource will be increased</li> </ul>
<p><b>Results/Outputs (Specific Objectives)</b> 1. Coordination of the project facilitated and supported 2. Participatory Monitoring and</p>	<ul style="list-style-type: none"> <li>• Equipment, services and materials procured by June 2008</li> <li>• Qualified and competent gender balanced human resource in place and undertaking their tasks by September</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Curriculum developed</li> <li>• Records from</li> </ul>	<ul style="list-style-type: none"> <li>• Activities will be carried out as planned</li> </ul>

Intervention Logic/Narrative summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions
Evaluation of the project supported 3. Integrating gender and marginalized communities (IPs) in the project supported 4. Curriculum for all FFs developed	2007	continuous monitoring <ul style="list-style-type: none"> <li>• AESA datasheets defined</li> </ul>	
<b>Activities</b>			
<b>Result 1:</b> 1.1 Coordinate project activities at the national, district and community levels: <ul style="list-style-type: none"> <li>• Develop a master annual work programme for each component</li> <li>• Implement the participating M&amp;E</li> <li>• Develop an associated disbursement plan and fund release system</li> <li>• Procure project goods and services</li> <li>• Strengthening linkages with partners</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures developed</li> <li>• Human resources facilitated and equipment in place by March 2008</li> <li>• Contracts signed and project accounts opened by July 2007</li> <li>• Financial disbursement system operational by August 2007 for national and district areas by December 2007</li> <li>• AESA manual developed for each technological package by June 2007</li> <li>• Increase in number of partners networking with Agropastoralism Project by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Participatory M&amp;E reports i.e. AESA</li> <li>• Inventory of assets</li> <li>• Financial records and reports</li> </ul>	<ul style="list-style-type: none"> <li>• Funds will be timely available</li> </ul>

Intervention Logic/Narrative summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions
<b>Result 2:</b> 2.1 Conduct continuous project monitoring and evaluation: 2.1.1 Conduct field supervision visits 2.1.2 Conduct Review Workshop 2.1.3 Production of reports 2.1.4 Review Meetings 2.1.5 Mid-term Review Missions 2.1.6 Participatory Joint Evaluation	<ul style="list-style-type: none"> <li>• 4 participatory monitoring and evaluation activities per district per year</li> <li>• Mid term evaluation by March 2010</li> <li>• End of project evaluation by December 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Participatory M&amp;E reports</li> <li>• Project progress and annual reports</li> </ul>	<ul style="list-style-type: none"> <li>• Funds will be timely received</li> </ul>
2.2 Disseminate and communicate project information and outputs	<ul style="list-style-type: none"> <li>• Number of information, education and communication (IEC) materials (e.g. billboards, caps, T-shirts, posters, brochures, umbrellas, magazines and newsletters) produced and disseminated by June 2012</li> <li>• Number of stakeholders and farmers reached by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and annual reports</li> <li>• Survey reports</li> <li>• Publication records</li> </ul>	
2.3 Compile end of project report	<ul style="list-style-type: none"> <li>• End of project report by June 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Study reports</li> <li>• Survey reports</li> </ul>	

## **9.0 Closing Remarks by F.M. Rugenyi, Senior Deputy Director Extension, Ministry of Agriculture**

Mr. F.M. Rugenyi presided over the closing ceremony. He thanked the participants for their patience and participatory contribution during the workshop. He noted that the workshop was to identify root causes of land degradation in agro-pastoral areas and barriers to adoption of sustainable land management practices. It was also supposed to come up with participatory monitoring and evaluation log frame a monitor tool of AgFFFS.

He advised the facilitators to promote the development of innovative technologies through inbreeding of technical and indigenous knowledge. He stressed that the project should avoid duplication of activities but should create synergies with on-going programmes in their respective districts. He encouraged the participants to promote enterprises diversification, which is the key for securing livelihoods, mitigating the impact of natural disasters and reducing conflicts in these marginal areas. He emphasized the need for stakeholder participation in all the project cycle in order to foster goodwill and project ownership and finally promote sustainability of the project

## **10.0 Annexes**

### **10.1 Land Degradation Terms of Reference**

Sub – Contract: Land Degradation Assessment in Mbeere, Mwingi and Narok districts under UNTS/KEN/001/GEF Project

#### **Kenya Agricultural Research Institute (KARI), Nairobi, Kenya**

#### **Purpose**

- a) The activities for which the funds provided by FAO under this agreement shall be Used are the following:
1. Description of current of land use status and practices in the pilot districts of Mbeere, Mwingi and Narok
  2. Carry out an analysis of threats, root causes and barriers to overcome land degradation and provide a draft log frame
  3. Development of land degradation Monitoring and Evaluation methodological framework (toolkit development)
  4. Coordination meetings and preparation of the final synthesis report

- b) The terms of reference and activity budget of the project given in the attached Annex 1 constitutes an integral part of this Agreement.

**Task 1: Identification of land use status and practices**

**(i) Activity**

- Definition and documentation of existing land use, pasture management practices, agricultural and livestock management practices, drought management strategies, livelihoods systems and socio-economic status of households in the selected districts.

**(ii) Outputs**

- A socio economic and biophysical baseline survey report on land use practices and their implication to land degradation.
- Challenges and opportunities for SLM identified

**(iii) Methodology**

- A socio economic and biophysical baseline survey in selected locations of Mbeere, Narok and Mwingi Districts will be carried out to determine and document the current land degradation status at household/farm level in terms of extents of degradation, land use practices and livelihood systems. Data collection will be undertaken using a combination of literature review and field surveys using a designed questionnaire and focused participatory rural appraisal (PRA). The questionnaire will capture household characteristics in terms: income sources, education level, household labour dynamics, land tenure, analysis of crop and livestock production, general perception on trends on major crops/livestock, soil and water management practices and associated trends or changes, agro biodiversity status etc.
- A total of thirty farms per district will be sampled based on the agro-ecological zonation and the current land use. The sites to be sampled will be done in consultation with the district stakeholders (Ministry of Agriculture and Ministry of livestock Development) at the stakeholders' workshop. Farm data collection will involve farmers and local stakeholders, opinion leaders who based on their memory recall of events, participatory mapping and transecting exercises we shall capture soil, water, vegetation, socio economic indicators, problems and coping strategies or opportunities. Soil samples from different land uses/management practices will be collected for laboratory fertility determination in order to assess the rate of nutrient depletion/ land degradation at farm level.

**Task 2: Carry out an analysis of threats, root causes and barriers to overcome land degradation and provide a draft log frame**

**(i) Activities**

- Analyses of root causes of land degradation in the project districts and threats and barriers for SLM
- Draft full size project intervention log frame based on problem tree analysis
- Write report, circulate, react to comments, finalize.



**(ii) Outputs**

- Refined analysis of threats, root causes and barriers;
- Draft log frame (intervention narrative, indicators, means of verification and risks and assumptions).
- Workshop report (outlining the two under bullet 1 and 2).

**(iii) Methodology**

- This will require the use of multiple methods and information sources and types, and the results will be more rigorous due to this approach. Triangulation of data and information sources will be used when examining complex systems such as society/environment interaction leading to land use and management change. Below is a summary table of the variety of primary data and information that will be collected concerning changes in land use and land degradation. In the analysis, this would be complemented with secondary data and information on human, livestock and wildlife population censuses reports and other government statistics, and literature reviews.

**Types of information and primary data collection methods**

	Surveys/ Interviews				GIS analysis
	<i>Literature review</i>	<i>Surveys</i>	<i>Group Interviews/PRAS</i>	<i>Key Informant interviews</i>	
Land use/cover change (LUCC)		X	X	X	X
LUCC driving forces	X	X	X	X	X
Perceptions of soil	X	X	X	X	
Plant indicators of soil degradation				X	
Soil erosion estimates	X	X			
Soil chemical and texture	X				
Socio economic issues	X		X		

The use of a variety of methods ensures more rigorous results and greatly improves interpretation. Mixing quantitative and qualitative information, for example, provides a better interpretation than either alone. While the quantitative analysis might not be wrong, it may represent only part of the system. Placing quantitative analysis results into a wider context to better interpret the results often entails using qualitative, process type of approach such as historical narrative.

A synthesis of relevant background information will be carried out these will include various government published and unpublished reports like PRA which will give time related data like time lines, trend lines of events and the causes of the same. Other approaches like focused group discussion with opinion leaders/elderly farmers and during districts stakeholder’s

workshops. The draft log frame will be developed from the available project document and the stakeholders in a workshop involving district and other related stakeholders.

**Task 3: Development of land degradation M&E methodological framework (toolkit development)**

**(i) Activities**

- Develop indicators, methods and tools for assessment of land degradation, status from both biophysical and socio economic point of view.
- Group meetings to harmonize the various LD methods
- Project coordination meetings during preparation of the final synthesis report

**(ii) Outputs**

- Methodological framework (M&E toolkit) for measuring land degradation including list of indicators, their causes and possible mitigation strategies for land degradation and livelihoods.

**(iii) Methodology**

- Literature review will be conducted to identify indicators of land degradations and how to measure each parameter. Various methodological frameworks developed to measure each of them from other studies will be documented and discussed in a workshop in NARL for adoption. For example nutrient depletion is the principal constraints in land degradation. Methodology developed by *Storvogel and Smaling (1990)* will be considered in this case. This methodology involves assessment of farm or catchments nutrient budget to get annual depletion rates of NPK per hectare of land. This approach uses Nutrient flows and balances in assessing the suitability of the farms.

**Time frame**

Activity	2007			
	March	April	May	June
1. Literature review, field biophysical and socioeconomic. Baselines data collection, district workshops, PRAs,				
2. Data entry and soil analysis				
3. Reporting				
4. Synthesis report				

**Task 4. Coordination meetings and preparation of the final synthesis report**

**Activity**

- Coordinate field data collection activities and final synthesis report writing done by various participating organizations
- Host monthly project progress meetings

### **Output**

- Minutes of the meetings
- Synthesis report

## 10.2 Workshop Program

Day / time	Time	Activity	Facilitator
14 <sup>th</sup> May	4.00 PM	Arrival /Registration	Secretariat
<b>Day 1. 15<sup>th</sup> May</b>			
<b>8.00 AM</b>	8.15 am	Registration	Secretariat
8.15 am	8.30 am	Introduction / Official Opening	Mold F E.O Esmail
		Workshop objectives	Louis Gachimbi
9:15 am	9:45 am	Progress report on FAO Agro pastoral FFS project	FAO
9:45 am	10:00 am	Introduction to Land degradation assessment indicators and methods (e.g LUCID)	<b>KARI</b>
	10:30 am	<b>TEA BREAK</b>	
10:30 am	11:45 am	Analysis of root causes and threats/barriers to SLM in agro pastoral areas (problem tree analysis – DPSIR tool)	Louis Gachimbi
11.45:00 am	1:00 pm	Group presentations	Stella Obanyi/ P.N Macharia/Louis Gachimbi
1.00 pm	2:00 pm	<b>LUNCH BREAK</b>	
2:00 pm	3:00 pm	Group presentations	Stella Obanyi/ P.N Macharia/Louis Gachimbi
3:00 pm	4:00 pm	Plenary discussion	Stella Obanyi/ P.N Macharia/Louis Gachimbi
4:00 pm	4:30 pm	<b>TEA BREAK</b>	
4.30 pm	5.30 pm	Plenary discussion	Groups
<b>Day 2 16<sup>th</sup> May</b>			
8:30 am	9.15 am	Agropastoralism farming systems challenges, coping strategies and opportunities and identification of best management practices	Louis Gachimbi
9.15 am	10.00 am	Group formation and group discussion	Louis Gachimbi and Stella Obanyi
10.00 am	10..30 am	<b>TEA BREAK</b>	
10.30 am	11.00 am	Group discussion	Louis Gachimbi and Stella Obanyi
11.00 am	12.00 am	Group feed back	Goups
12. 00 am	12.30 am	Agro pastoral FFS Curriculum	Stella Obanyi
12.30 am	1:00 pm	Group formation and discussions	Stella Obanyi/ P.N Macharia/Louis Gachimbi
1:00 pm	2:00 pm	<b>LUNCH BREAK</b>	

2:00 pm	2.30 pm	Group feedback	
2:30 pm	3:00 pm	Agro pastoral logical framework	Louis Gachimbi
3:00 pm	4:00 pm	Group discussions	Stella Obanyi/ P.N Macharia/Louis Gachimbi
4:00 pm	4:30 pm	<b>TEA BREAK</b>	
4:30 pm	5:30 pm	Group discussions	Stella Obanyi/ P.N Macharia/Louis Gachimbi
<b>Day 3. 17<sup>th</sup> May</b>			
8.15am	10.00am	Group discussions	Stella Obanyi/ P.N Macharia/Louis Gachimbi
10.00 am	10.30 am	<b>TEA BREAK</b>	
10.30 am	1.00 pm	Logframe feed back	Stella Obanyi/ P.N Macharia/Louis Gachimbi
		Official closing	KARI (Macharia/Gicheru)
1.00 pm	2.00 pm	<b>LUNCH BREAK</b>	
2.00 pm		Departmental/logistical issues	Secretariat

### 10.3 List of Participants

Name	Organization	Address	E-mail
1. P.T. Gicheru	KARI	P.O Box 14733 NRB	<a href="mailto:cdnarl@iconnect.co.ke">cdnarl@iconnect.co.ke</a>
2. Aginga Edward	Agriculture	P.O Box 31 Mwingi	0733-462939
3. Wilson K. Bii	Agriculture	P.O Box 31 Mwingi	
4. Benson K. Njeru	Livestock	P.O Box 41 Siakago	<a href="mailto:nalepmbeere@winnet.co.ke">nalepmbeere@winnet.co.ke</a>
5. Peter K. Mwangi	Farmer	P.O Box 17 Siakago	
6. Louis N. Gachimbi	KARI	P.O Box 14733 NRB	<a href="mailto:inmasp@skyweb.co.ke">inmasp@skyweb.co.ke</a>
7. Sammy M. Mwanzia	Farmer	P.O Box 15 Mwingi	0736-999914
8. Robert Musili	Livestock	P.O Box 31 Mwingi	
9. Johnson Njeru Njogu	RTDC	P.O Box 82 Siakago	0724-586321
10. John K. Wambugu	RTDC	P.O Box 82 Siakago	0736-831452
11. Kiige P.K	Agriculture	P.O Box 80 Siakago	<a href="mailto:kariukikiige@yahoo.com">kariukikiige@yahoo.com</a>
12. Paul M. Kingethwa	ALRMP II	P.O Box 45 Siakago	068-21098
13. Marth Kirukmet	Social Services	P.O Box 217 Siakago	0720-484377
14. Karani F.G	Agriculture	P.O Box 80 Siakago	<a href="mailto:karanifg@yahoo.com">karanifg@yahoo.com</a>
15. Peter Mwangi	Agriculture	P.O Box 80 Siakago	0733-286433
16. Kibet J. Kiboi	Agriculture	P.O Box 80 Siakago	0723154372
17. Kungu J.K	Livestock	P.O Box 41 Siakago	0733495670
18. P. N. Macharia	KARI	P.O Box 14733 NRB	<a href="mailto:kss@iconnect.co.ke">kss@iconnect.co.ke</a>
19. James K. Mwangi	Forest (Kenya )	P.O Box 30 Mwingi	0735204014
20. J.K Githinji	Agriculture	P.O Box 81, Mwingi	0726-524689
21. John M. Nzuba	Agriculture	P.O Box 31, Mwingi	0724923029
22. John M. Njoka	Livestock	P.O Box 31, Mwingi	0723770164
23. T.K. Mutinda	FAO/MOA	P.O Box 16, Kitui	0722-300360, <a href="mailto:tkmutinda@yahoo.com">tkmutinda@yahoo.com</a>
24. John M. Mwangu	Livestock	P.O Box 31, Mwingi	0724204591
25. Munyao B.M	Livestock	P.O Box 31, Mwingi	0734793631
26. Pauline Kyavoa	Livestock	P.O Box 31, Mwingi	0727090262
27. Patricia M. Wambua	NEMA	P.O Box 30, Mwingi	0735-593702
28. Stella Obanyi	KARI	P.O Box 14733, NRB	0722755282
29. Zablon G. Njeru	Embu community Programme CCF- Ishiara	P.O Box 1963, Embu	0721325164

30. A.O.Esmail	MoL&FD	P.O Box 39188, NRB	0722-297500
31. Esther Maina	KARI	P.O Box 14733, NRB	020-4443376
32. Eutycus Nderitu	KARI	P.O Box 14733, NRB	020-444144
33. F.M Rugenyi	MOA	P.O. Box 30028 NRB	0720-752978